Vector System

User Manual

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CONNECTING THE FUTURE®

Vector System

User Manual, Part Number 127092

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Vector System

User Manual

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Chapter 1: Vector Products

1.1 Overview

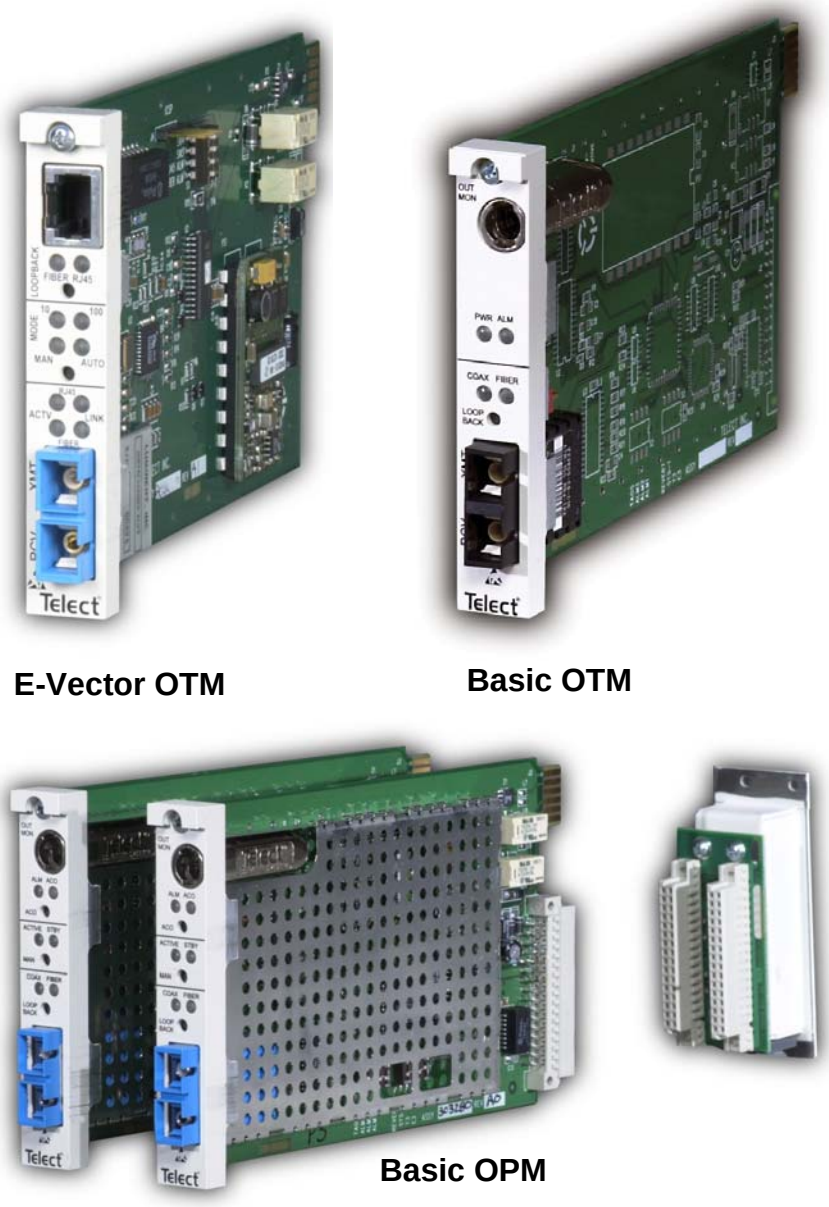

Figure 1 - Vector Modules

Vector is a category of Telect active products for bi-directional electrical/optical, point-to-point signal conversion. Telect manufactures Vector Optical Transport Modules (OTM) for Ethernet systems, as well as for basic (T1 / E3 / STS-1) systems, with either single-mode or multi-mode

SC or ST optical connections. Telect also offers an Optical Protection Module (OPM), allowing automatic or manual switchover from the active OPM to a standby OPM in basic systems.

Features common to all Vector modules:

- TFA Optic Connections and LEDs
- Status & Loopback LEDs
- Automatic Line Build Out
- Major & Power Remote Alarming
- Low Power — Low Heat Dissipation
- Wide operating range: 20 to 60Vdc
- Approved: FCC Part 15, Class A; UL/CSA 1950; NEBS Level 3

Vector Modules fit Telect's Broadband Connectivity System II (BCSII) chassis panels for standard 19 in. and 23 in. racks, such as the one featured on the front cover. (The Front cover features a 19-in. BCSII Horizontal Chassis with six Basic OTMs and two E-Vector OTMs.) Vector Modules fit alongside Telect's DSX and DNI modules in all multifunction BCSII chassis with power (-48V or 24V) hookup. (See Chapter 5 for details on applicable BCSII chassis.) Telect offers both vertical (2RU) and horizontal (1RU) BCSII chassis panels along with special Vector Fiber/Copper Trays for convenient cable management.

For Telect's MIX 56 (Telect's DS1/DS3, multiplexer/demultiplexer panels), Telect offers a *SideCar* chassis option that mounts to a MIX panel in a 23-in. rack. SideCar holds up to two Vector modules and extends the versatility of the MIX 56 by adding two-way optical-to-electrical conversion of DS3 I/O.

Vector is intended for both large- and small-site applications. But for LANs, campuses, cell-tower base installations, co-locates, and other remote sites, Telect also offers this same powerful electrical/optical connectivity in a standalone configuration for surface mounting, such as on a wall, or on the side of a cabinet, or on a desktop. These standalone units handle a pair of OTMs or OPMs, powered from either standard office Vdc or from a power supply that converts Vdc from a 120Vac utility receptacle. (See Chapter 8, "Accessories".) Standalone Wall-Mount and Desk-Mount chassis include built-in cable management.

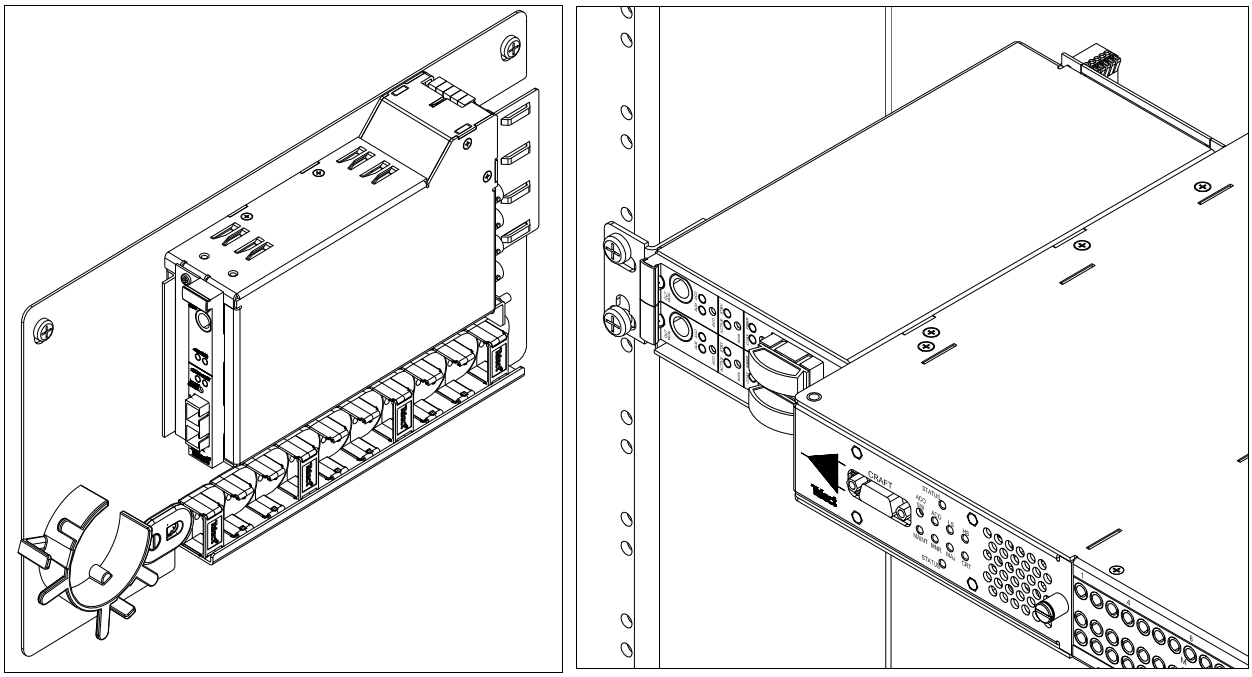

Figure 2 - Telect Wall-Mount Chassis with 1 Basic OTM & a Front Spacer (left)
Telect MIX 28 with a Pair of Basic OPMs in a SideCar Chassis (right)

1.2 Vector Basic Optical Transport Module (OTM)

Telect's basic Vector Optical Transport Module (OTM) converts a local electrical NE signal to a single- or multi-mode T3, E3, or STS-1 optical signal and transmits that to a receiving OTM up to 50 km away. The remote OTM receives the optical signal and reconverts to electrical, sending that to a remote NE. Conversely, the remote OTM converts and transmits optical signals to the local OTM.

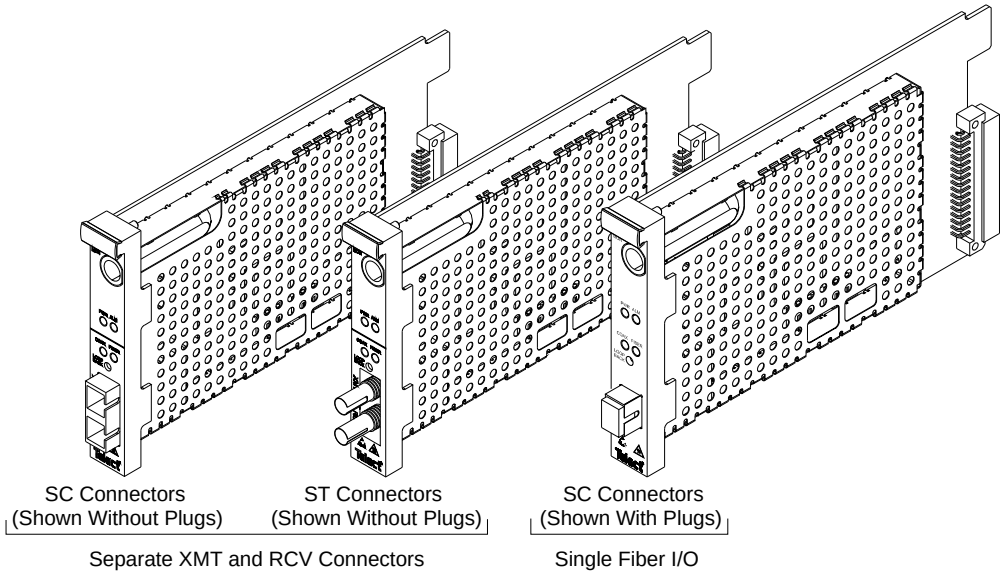

Figure 3 - Vector Basic Optical Transport Module (OTM)

Basic OTM Model No.	Description
Module Only	
710-3201-1001-U	Multi-Mode with ST Connectors
710-3201-1002-U	Multi-Mode with SC Connectors
710-3201-2001-U	Single Mode with ST Connectors
710-3201-2002-U	Single Mode with SC Connectors
710-3201-2102-U	Single Mode with SC Connectors, Hardened[1]
Matched Pair of Bi-Directional Single-Fiber Modules[2]	
710-3201-4002-U	Single Mode with SC Connectors
Module (1) & Front Spacer in a Standalone Wall-Mount Chassis	
710-1001-1001-U	Multi-Mode with ST Connectors
710-1001-1002-U	Multi-Mode with SC Connectors
710-1001-2001-U	Single Mode with ST Connectors
710-1001-2002-U	Single Mode with SC Connectors
710-1001-2102-U	Single Mode with SC Connectors, Hardened[1]
1. Extended operating temperature range. 2. Each transmits and receives at different, complementary 1530 nm and 1310 nm wavelengths.	

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1.2.1 Basic OTM Features

NOTE: See Page 1-2 for common Vector features.

- Compatible with BCSII chassis
- Selectable T3, E3, and STS-1 signal rates
- ST or SC optical connectors
- Single- or multimode optical signals.
- Can be up to 900 ft (734 or RG-59 coaxial cable) from remote NE
- Point-to-point applications up to 50 km
- Front mini-WECO monitor jack
- LED indicators for power failure and loss of optical/electrical signals

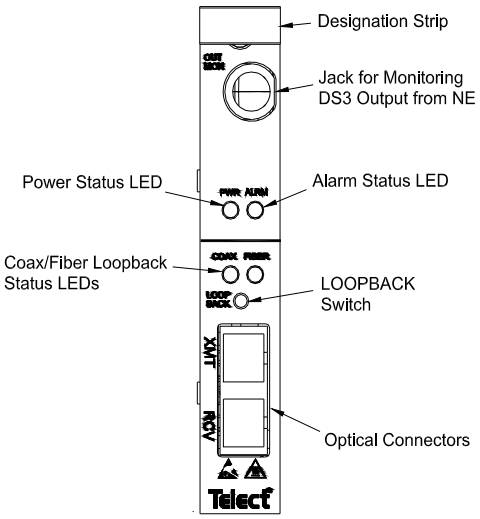

Figure 4 - OTM With Separate XMT and RCV SC Connectors

- Built-in electrical/optical loopback — selectable at front of module — along with status LEDs

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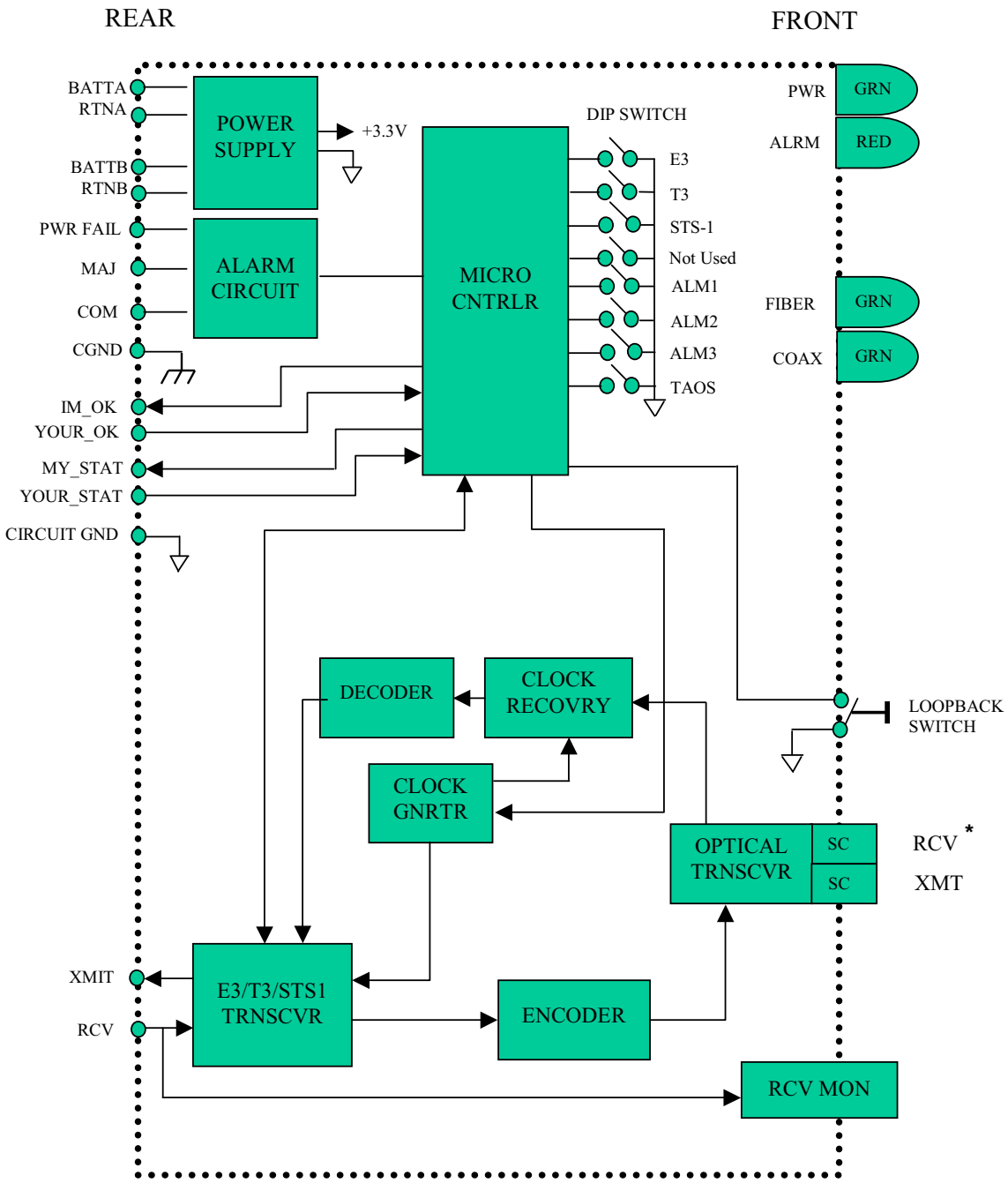
1.2.2 Basic OTM Block Diagram



*** OTM with separate XMT and RCV connectors is shown. Single-Fiber OTM transmits/receives using a single SC connector at each end.**

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1.2.3 Specifications (Basic OTM & Basic OPM)

The tables that follow contains specification for both basic OTM and OPM. (OPMs are covered in the next subsection.)

Electrical Interface	Specifications
Receive Equalization:	0 to 900 ft RG-59 (or equivalent)
Input Impedance:	75Ω
Output Impedance:	75Ω
Monitor Level:	21 dB ±1.5 dB below signal level
Format Selection:	Manually selected prior to power up
Error Rate (max.):	$1x10^{-10}$, with 23 dB fiber attenuation, single-mode glass fiber, 0 to 50°C
Return Loss:	≤-26 dB 300kHz to 30MHz, single OTM or OPM ≤-16 dB 300kHz to 30MHz, redundant OPM

Signal Formats	Specifications
T3	
Input Data Rate:	44.736 Mbps ±100 ppm
Input Data Format:	Bipolar with B3ZS coding
Jitter Tolerance:	Meets GR-499-CORE requirements
Output Data Rate:	Same as input signal, transmit clock is recovered from input signal
Output Data Format:	Bipolar with B3ZS coding
Output Pulse Shape:	Complies with GR-499-CORE and ANSI T1.102_1993
STS-1	
Input Data Rate:	51.84 Mbps ±100 ppm
Input Data Format:	Bipolar with B3ZS coding
Jitter Tolerance:	Meets GR-499-CORE requirements
Output Data Rate:	Same as input signal, transmit clock is recovered from input signal
Output Data Format:	Bipolar with B3ZS coding
Output Pulse Shape:	Complies with GR-CORE-253
E3	
Input Data Rate:	34.368 Mbps ±100 ppm
Input Data Format:	AMI with HDB3 coding
Jitter Tolerance:	Meets ITU-T G.832_1993 requirements
Output Data Rate:	Same as input signal, transmit clock is recovered from input signal
Output Data Format:	AMI with HDB3 coding
Output Level:	1.00 Vpk, ±10%
Output Pulse Shape	Complies with ITU-T G.703

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Environmental	Specifications
Modules Designed for Moderate Site Conditions	
Operating Temp Range:	0 to 50°C ambient
Storage Temp Range:	–55°C to 85°C
Operating Humidity:	25% to 80%, noncondensing
Storage Humidity:	≤ 90%
Heat Dissipation:	706W/m^2 per meter @ ambient of 19°C (66°F)
Hardened Modules Designed for Extreme Conditions	
Operating Temp Range:	–40°C to 65°C ambient
Storage Tempe Range:	–55°C to 85°C ambient
Operating Humidity:	5% to 95%, noncondensing
Storage Humidity:	≤ 95%
Altitude:	0–10,000 ft (3,048m), operating

Optical Interface	Specifications
Multimode Option	
Range:	1.5 km (11 dB link budget)
Optical Source:	LED, 1300 nm
Transmit Pwr (Nom):	–16 dBm, into 1m 62.5/125 µm multimode glass fiber, all-ones electrical signal, 25°C
Transmit Pwr (Min.):	–20 dBm, into 1m 62.5/125 µm multimode glass fiber, all-ones elec signal, 0 to 50°C ambient
Optical Receiver:	PIN diode and integral amplifier
Receiver Range:	–11 dBm to –31 dBm
Link Loss Budget:	11 dB
Connector:	SC, both transmit and receive, ST optional
Single Mode Option	
Range:	50 km (19 dB link budget)
Optical Source:	Laser, 1310 nm nominal wavelength
Spectral Width:	±50 nm max
Transmit Pwr (Nom.):	–11 dBm, into 1m 9 µm single-mode glass fiber, all-ones electrical signal, 25°C
Transmit Pwr (Min.):	–15 dBm, into 1m 9 µm single-mode glass fiber, all-ones electrical signal, 0 to 50°C ambient
Extinction Ratio:	8.2 dB min.
Laser Safety:	Unconditionally eyesafe laser, IEC 825/CDRH Class 1 compliant
Optical Receiver:	PIN diode and integral amplifier

Optical Interface	Specifications
Receiver Range:	–8 dBm to –34 dBm
Link Loss Budget:	19 dB
Connector:	SC, XMT & RCV (ST optional on OTMs and OPMs with separate XMT & RCV connectors)

Power	Specifications
Powering Architecture:	Single DC-DC converter
Redundant Power:	Chassis accommodate A and B battery inputs; input are diode OR'ed on the module
Operating Voltage, Chassis:	20 to 60Vdc
Current (Max.):	180mA @ 20Vdc

Remote Alarm Indicators	Specifications
PWR Alarm	Loss of 3.3V on-board power, normally open contact, common output at rear of chassis, "PWR ALARM"
MAJ Alarm	Condition determined at power-up, normally open contact, common output at rear of chassis, "MAJ ALARM"

OPM Redundancy	Specifications
Active Module:	Right-hand module, viewed from the front of the chassis, is the factory default
Automatic Switch:	Switch of data traffic from active to standby modules initiated by detection of loss of optical or electrical signal
Manual Switch:	Pressing MAN ("Manual") on active module forces switchover to standby data link if standby modules are installed and functioning
Switch Timing:	≤5 ms, applies to hardware or fiber data link failure

1.3 Vector Basic Optical Protected Module (OPM)

Vector OPMs are designed for use in pairs at each end of the optical link. The additional OPM at each end is an automatic standby to protect against signal loss on the data link or failure of the active OPMs. Automatic switchability between active and standby OPMs also allows “hot swapping” without service interruptions.

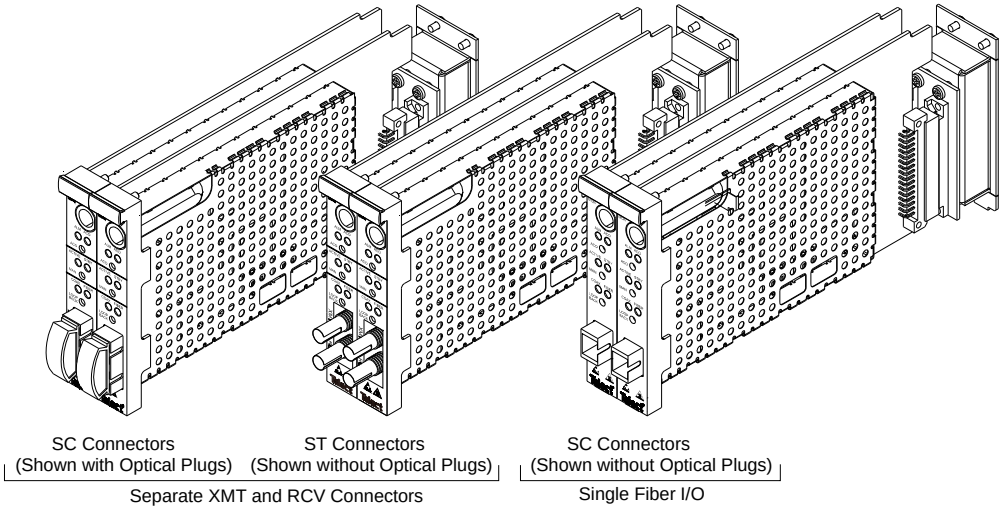

Figure 5 - Vector Basic Optical Protected Module (OPM)

Basic OPM Model No.	Description
Modules (2) with a Backplane Kit for a BCSII Chassis or MIX SideCar	
710-3201-1221-U	Multi-Mode with ST Connectors
710-3201-1222-U	Multi-Mode with SC Connectors
710-3201-2221-U	Single Mode with ST Connectors
710-3201-2222-U	Single Mode with SC Connectors
710-3201-2122-U	Single Mode with SC Connectors, Hardened[1]
Two Matched Pairs of Bi-Directional Single-Fiber Modules with Backplane Kits[2]	
710-3201-4222-U	Single Mode with SC Connectors
Modules (2) in Standalone Wall-Mount Chassis	
710-1001-1221-U	Multi-Mode with ST Connectors
710-1001-1222-U	Multi-Mode with SC Connectors
710-1001-2221-U	Single Mode with ST Connectors
710-1001-2222-U	Single Mode with SC Connectors
710-1001-2122-U	Single Mode with SC Connectors, Hardened[1]

1. Extended operating temperature range.

2. Each pair transmits and receives at different, complementary 1530 & 1310 nm wavelengths.

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1.3.1 Basic OPM Features

NOTE: See Page 1-2 for common Vector features.

- Loss of signal protection
- Manual and automatic switchover between active and standby modules
- Compatible with BCSII, wall-mount, desk-mount, & MIX SideCar chassis
- Selectable T3, E3, and STS-1 signal rates
- ST or SC optical connectors
- Single- or multimode
- Can be located up to 900 ft from remote NE (using 734 or RG-59 coaxial cable)
- Point-to-point applications up to 50 km
- Front mini-WECO monitor jack for coax input (received elec signal)
- LED indicators for loss of optical/electrical signal along with manual alarm cutoff (ACO) switch and status LED

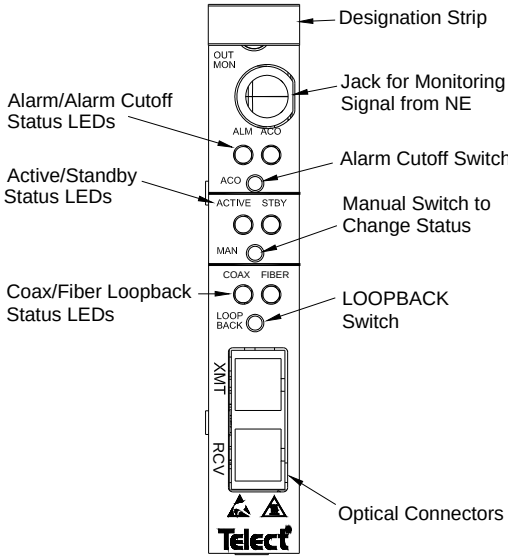

Figure 6 - OTM With Separate XMT and RCV SC Connectors

- Built-in electrical/optical loopback — selectable at front of module — along with status LEDs

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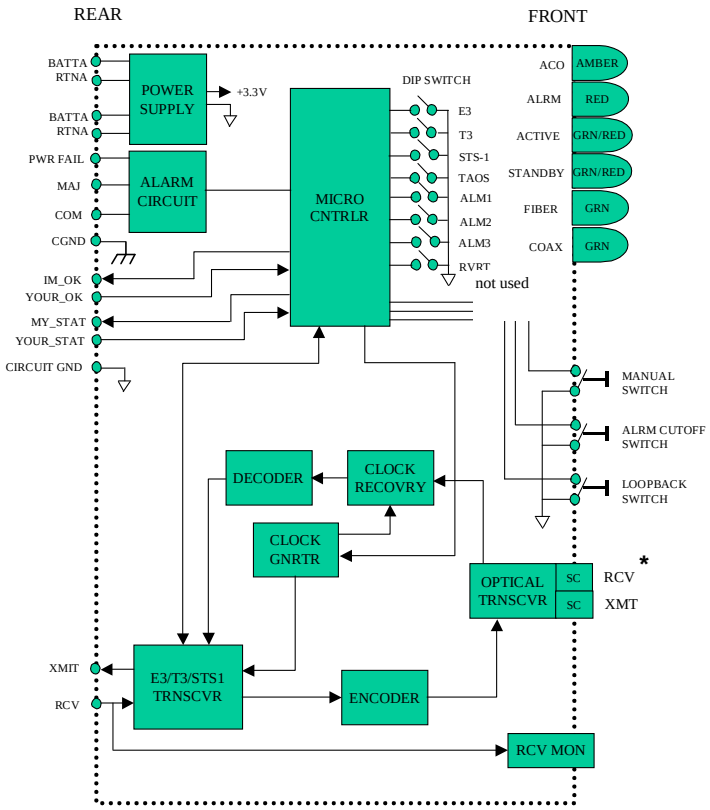
1.3.2 Basic OPM Block Diagram



*** OPM with separate XMT & RCV connectors is shown. Single-Fiber OPM transmits/receives using a single SC connector at each end.**

1.3.3 Basic OPM Specifications

See the tables in Section “1.2.3 Specifications (Basic OTM & Basic OPM)” on page 7.

1.4 E-Vector Optical Transport Module

Telect's E-Vector Optical Transport Module (OTM) converts a local 10/100 Ethernet electrical signal to a single- or multmode, Ethernet optical signal and transmits that to a receiving E-Vector OTM up to 30 km away. The remote E-Vector OTM reconverts optical 10/100 Ethernet to electrical 10/100 Ethernet. Conversely, the remote E-Vector OTM transmits optical signals to the local E-Vector OTM.

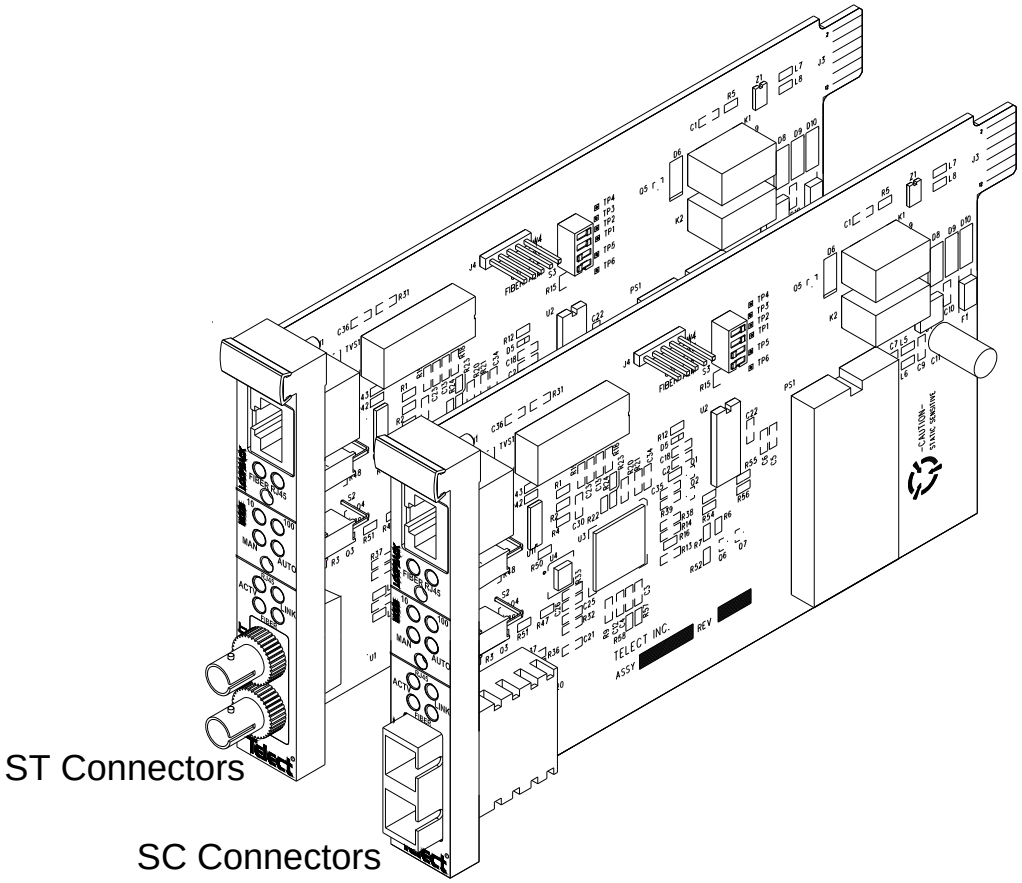


Figure 7 - E-Vector OTM

E-Vector OTM Model No.	Description
Module Only	
710-3201-1301-E	Multi-Mode with ST Connectors
710-3201-1302-E	Multi-Mode with SC Connectors
710-3201-2301-E	Single Mode with ST Connectors
710-3201-2302-E	Single Mode with SC Connectors
Module (1), Front Spacer, & Rear Spacers (2) in a Standalone Wall-Mount Chassis	
710-1001-1301-E	Multi-Mode with ST Connectors
710-1001-1302-E	Multi-Mode with SC Connectors

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E-Vector OTM Model No.	Description
710-1001-2301-E	Single Mode with ST Connectors
710-1001-2302-E	Single Mode with SC Connectors

1.4.1 E-Vector Features

NOTE: See Page 1-2 for common Vector features.

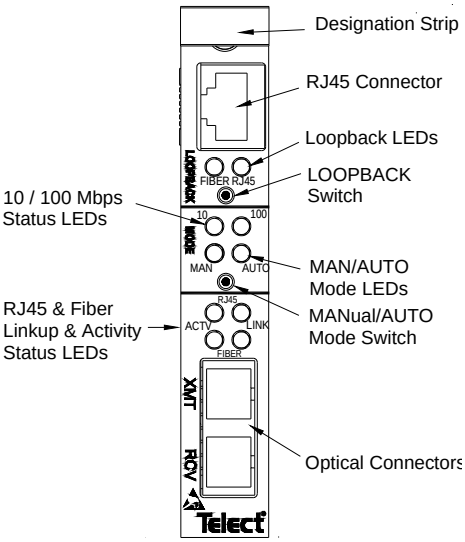

Figure 8 - E-Vector Features

- Compatible with BCSII, wall-mount, desk-mount, and MIX SideCar chassis
- Manual or automatic Ethernet signal negotiation — selectable on front of module — along with indicator LEDs
- Automatic Ethernet speed selection (10 /100 Mbps), along with indicator LEDs
- ST or SC optical connectors
- Single- or multimode op signals.
- Can be located up to 100 m from remote network element (using Cat 5 cable)
- Point-to-point applications up to 30 km
- Low-profile, shielded RJ45 connectors for either shielded or unshielded twisted pairs
- Automatic full- or half-duplexing
- Status LEDs for fiber and RJ45 linking and activity
- LED indicators for power and loss of optical and electrical signal
- Built-In electrical/optical loopback — selectable at front of module — along with status LEDs

1.4.2 E-Vector Block Diagram

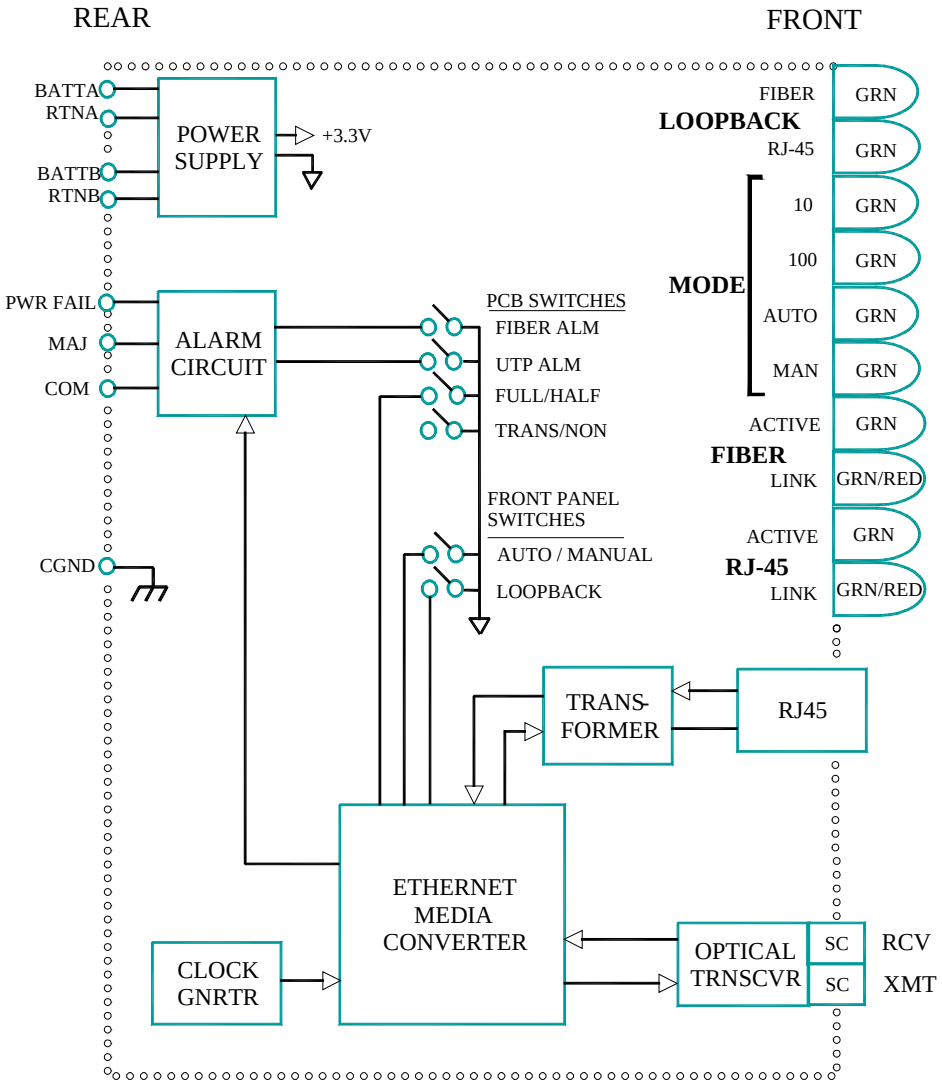

Figure 9 - Schematic

1.4.3 E-Vector Specifications

Electrical Interface	Specifications
Protocol	ANSI/IEEE 802.3
Data Rate	10 / 100 Mbps
Signaling	10BASE-T, 100BASE-TX
Connection Rate	• Auto negotiate to greatest common denominator of end network interfaces, or • Manual mode
Segment Length (Max.)	100 m, Cat 5 (shielded or unshielded)
Interface Connector	RJ45, Shielded
RJ45 Pins	1 — Transmit + 2 — Transmit - 3 — Receive + 4 — HF Termination 5 — HF Termination 6 — Receive - 7 — HF Termination 8 — HF Termination

Environmental	Specifications
Operating Temperature Range	0 to 50°C ambient
Storage Temperature Range	-55°C to 85°C
Operating Humidity	25% to 80%, noncondensing
Storage Humidity	≤90%
Heat Dissipation	15W/ft^2 per foot @ ambient 26°C

Optical Interface	Specifications
Optical Source	Laser, 1310 nm (nominal wavelength)
Spectral Width	± 50 nm (max.)
Transmit Power (Nominal)	-11 dBm, into 1m 9µm single- mode glass fiber, 25°C
Transmit Power (Minimum)	-15 dBm, into 1m 9µm single- mode glass fiber, 0 to 50°C ambient
Optical Distance	Up to 30 km
Extinction Ratio	8.2 dB (min.)
Laser Safety	Unconditionally eyesafe laser, IEC 825/CDRH Class 1 compliant

Optical Interface	Specifications
Optical Receiver	PIN diode and integral amplifier
Receiver Dynamic Range	-8 dBm to -34 dBm
Link Loss Budget	19 dB
Connector	SC or ST

Physical	Specifications
Dimensions	Width, .650 in. (16.51 mm) Height, 3.895 in. (98.93 mm) Depth, 6.838 in. (173.69 mm)
Weight	.25 lb (~115 g)

Power	Specifications
Powering Architecture	Single DC-DC converter
Redundant Power	Chassis accommodates A and B battery inputs; inputs are diode “OR’ed” on the module
Operating Voltage, Chassis	20 to 60 Vdc
Current (Max.)	110 mA @ 18 Vdc per module

Remote Alarm Indicators	Specifications
PWR Alarm	Loss of 3.3V on-board power, normally open contact, common output at rear of chassis, “PWR ALARM”
MAJ Alarm	Condition determined at power-up, normally open contact, common output at rear of chassis, “MAJ ALARM”

1.5 Technical Support (USA)

By e-mail: getinfo@telect.com
By phone: 888-821-4856 or 509-921-6161

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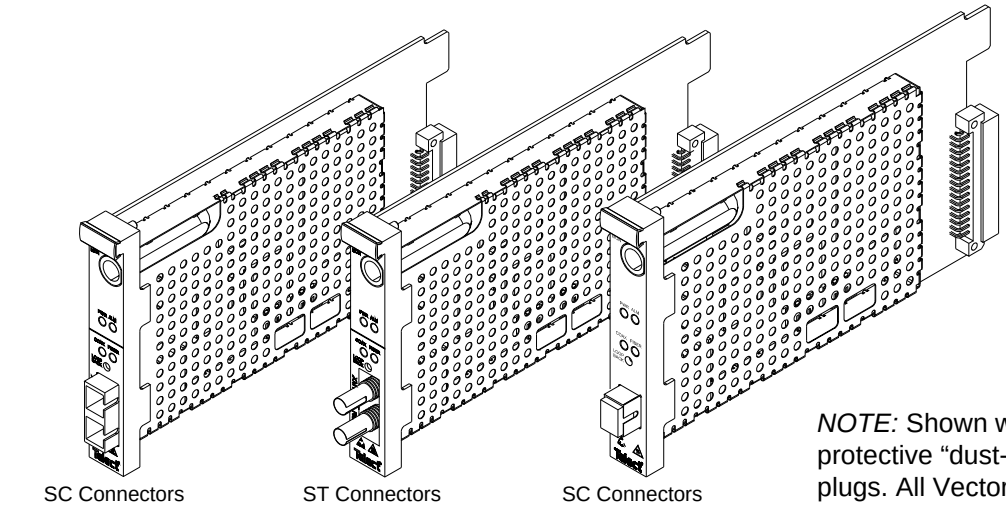
Chapter 2: Vector Basic OTM

2.1 Overview



NOTE: Shown without protective "dust-cover" plugs. All Vector products include plugs.

Figure 10 - Vector Basic OTM

CAUTION

CAUTION! Only qualified technicians may install and maintain this product.

ALERT

ALERT! These instructions presume you have verified that the Telect equipment being installed is compatible with the rest of the system, including power, ground, circuit protection, signal characteristics, equipment from other vendors, and local codes or ordinances.

2.2 Installation Tools & Equipment

You need only standard tools. Use listed components (UL-recognized, CSA, ETL, TUV agency) and tools.

2.3 Inspection

Compare the contents of the Vector OTM shipping container with the packing list. Call Telect if you are missing anything.

Telect is not liable for shipping damage.

If the shipping container is damaged, keep it for the carrier's inspection. Notify the carrier and call Telect's Customer Service Department: 1-800-551-4567 or 1-509-926-6000.

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Keep the container until you have checked equipment operation. If you experience any kind of problem, call Telect's Customer Service Department. Use the original, undamaged container if you are instructed to return the Vector OTM to Telect.

2.4 Installation Setup — Setting PCB Switches

ALERT

ALERT! The modules are sensitive to static. Wear a grounded wrist strap and perform any other available ESD procedures when handling them.

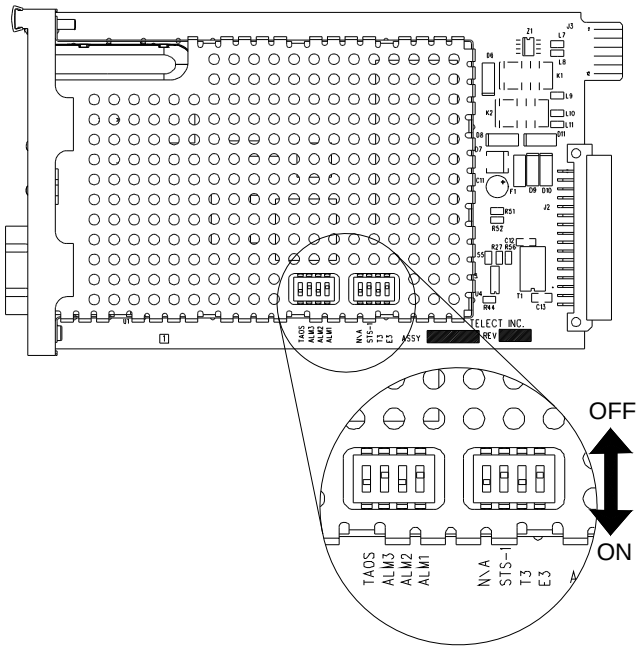

Figure 11 - Setting PCB Switches

PCB Switches	ON	OFF
E3*	E3 rate selected	Not selected
T3*	T3 rate selected (default)	Not selected
STS-1*	STS-1 rate selected	Not selected
N/A	—— not used ——	
ALM1	Major Alarm Contacts Close on Local Loss of Optical Signal	Major Alarm Relay Unaffected by Loss of Optical Signal
ALM2	Major Alarm Contacts Close on Local Loss of Electrical Signal	Major Alarm Relay Unaffected by Loss of Electrical Signal

PCB Switches	ON	OFF
ALM3	Major Alarm Contacts Close on Far-End Loss of Signal**.Optical LOS Causes OPM to Transmit Optical All One Alarm Signal to Far-End OPM.	Major Alarm Relay Unaffected by Far-End Loss of Signal**. Optical All-Ones Alarm Signal is Not Transmitted on an Optical LOS.
TAOS	Transmit an Electrical All-Ones Alarm Signal on Local Loss of Optical Signal	No Electrical All-One Signal on an Optical Loss of Signal
*Only one of these can be selected. If none selected, Vector defaults to T3. **Far-end loss of signal is detected by locally receiving an all-ones optical signal.		

2.5 Installation

ALERT! The modules are sensitive to static. Wear a grounded wrist strap and perform any other available ESD procedures when handling them.

OTMs may be installed in any or all slots in a 19-in. or 23-in. BCSII chassis, or in an OTM Standalone Wall-Mount or Desk-Mount chassis, or in a Telect SideCar chassis on the left side of a Telect MIX 56 or MIX 28. When installing less than a full complement of OTMs, prefer the extreme right or left end of the chassis for best heat dissipation.

The temperature at the faceplate of an OTM can rise to 49°C (120°F) at an ambient temperature of 19°C (66°F). If you fully load a BCSII chassis with OTMs, consider the effect that heat may have on other shelves above the full-loaded OTM BCSII. If necessary, either leave 2RU of space (Either leave it vacant or install shelves that dissipate no heat.) above that BCSII chassis for heat dissipation or install a 1RU Telect heat baffle above that BCSII chassis.
(See Chapter 8, “Accessories.”)

Procedure steps:

1. Identify both modules to be used — they are installed in pairs.
2. Set switch options on the OTM PCB. (See the preceding page.)
3. If applicable, if you are adding a second OTM to a wall-mount chassis, remove the blank cover at the front of the wall-mount chassis.
4. Slide module into chassis card guides; press into rear connectors.

   The illustrations that follow show typical installations.
5. Secure with top screw on module faceplate.

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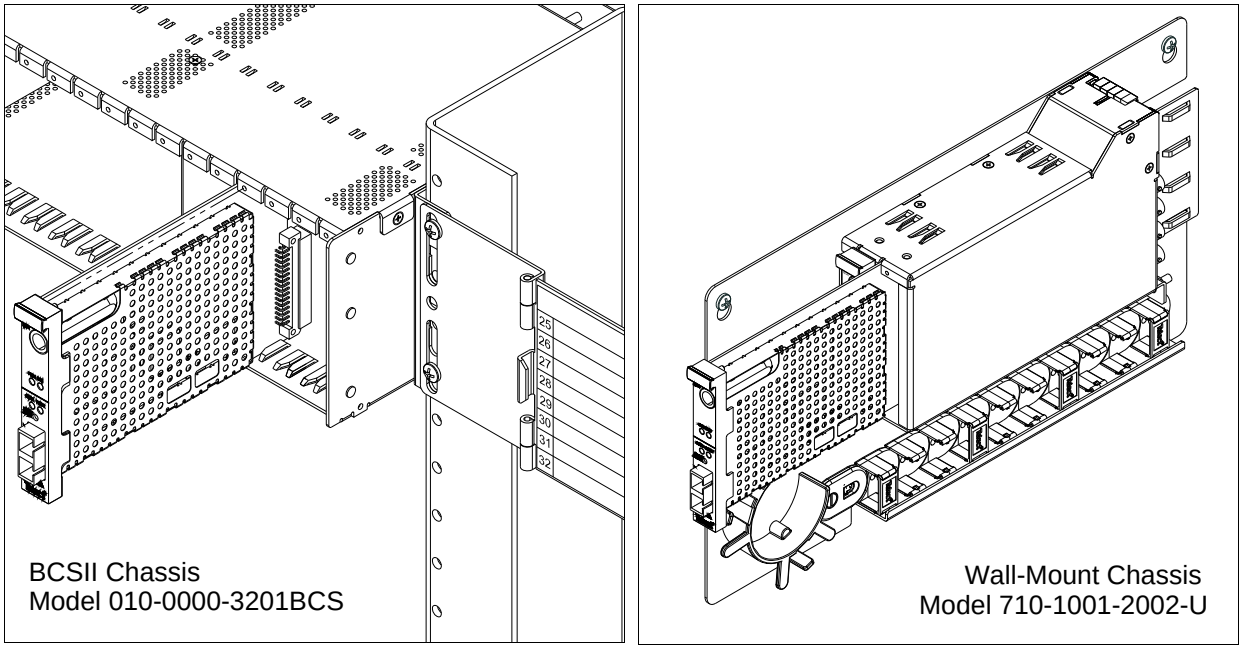

Figure 12 - Installing Basic OTM in a BCSII Chassis (left) &
Installing Basic OTM in a Standalone Wall-Mount Chassis (right)

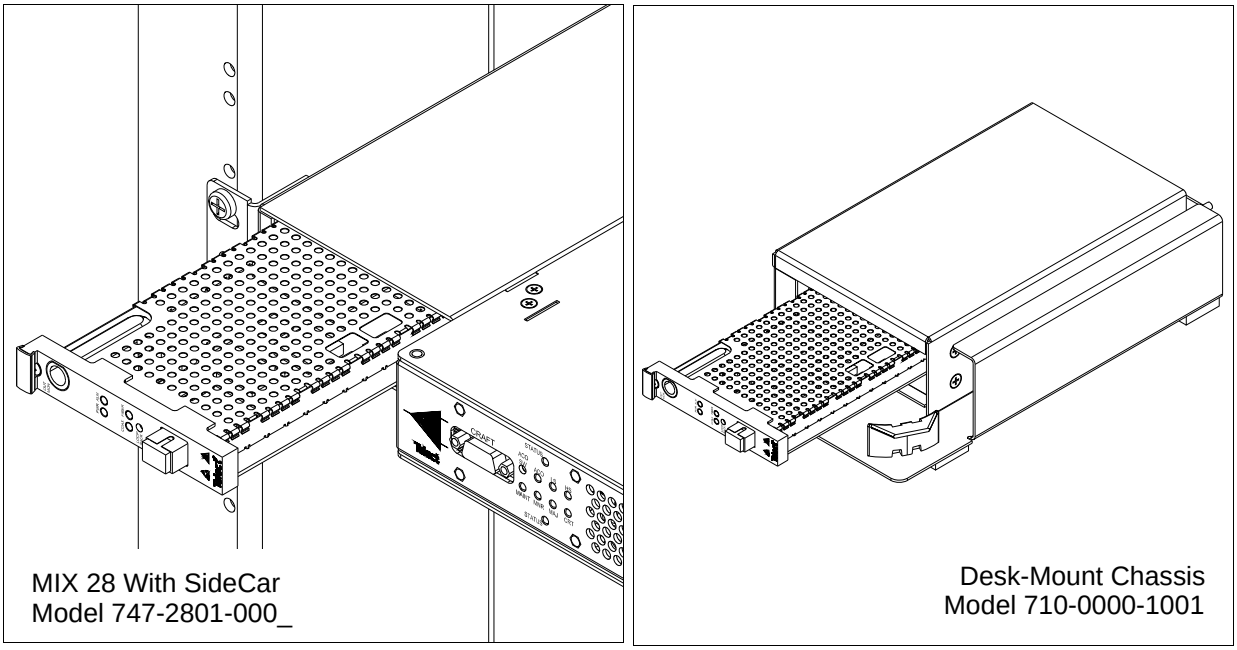

Figure 13 - Installing Basic OTM in a MIX 28 SideCar (left) &
Installing Basic OTM in a Standalone Desk-Mount Chassis

6. Identify BNC I/O ports for the card position on the backplane and install I/O cables from the network element. (IX and OX cross-connect backplane BNC connectors for this card position will not be used. You may want to insert terminating plugs into these unused BNCs.)

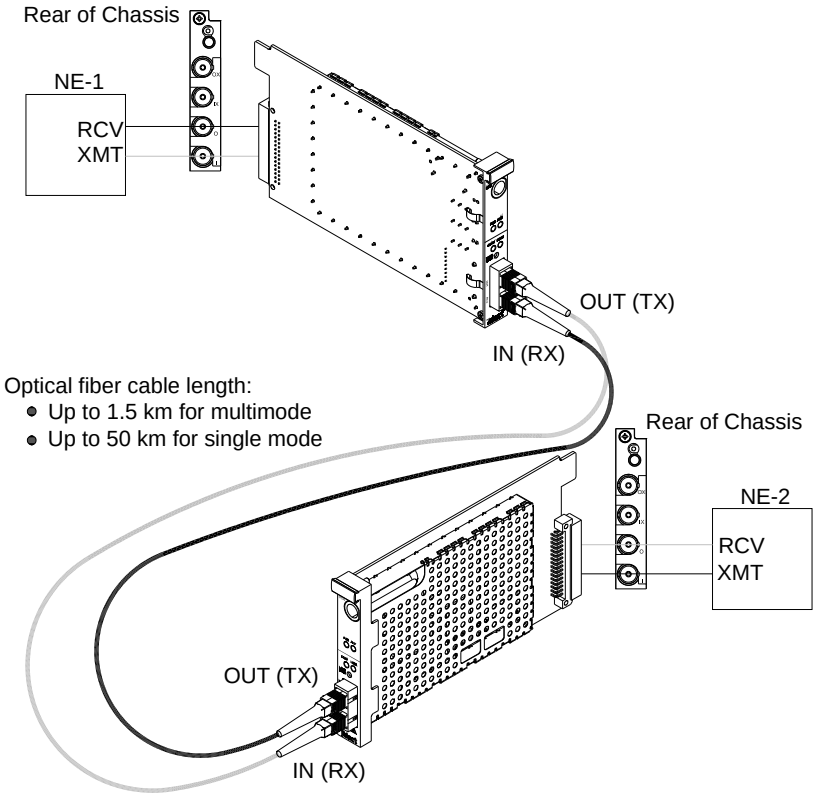

Figure 14 - Installing I/O cables

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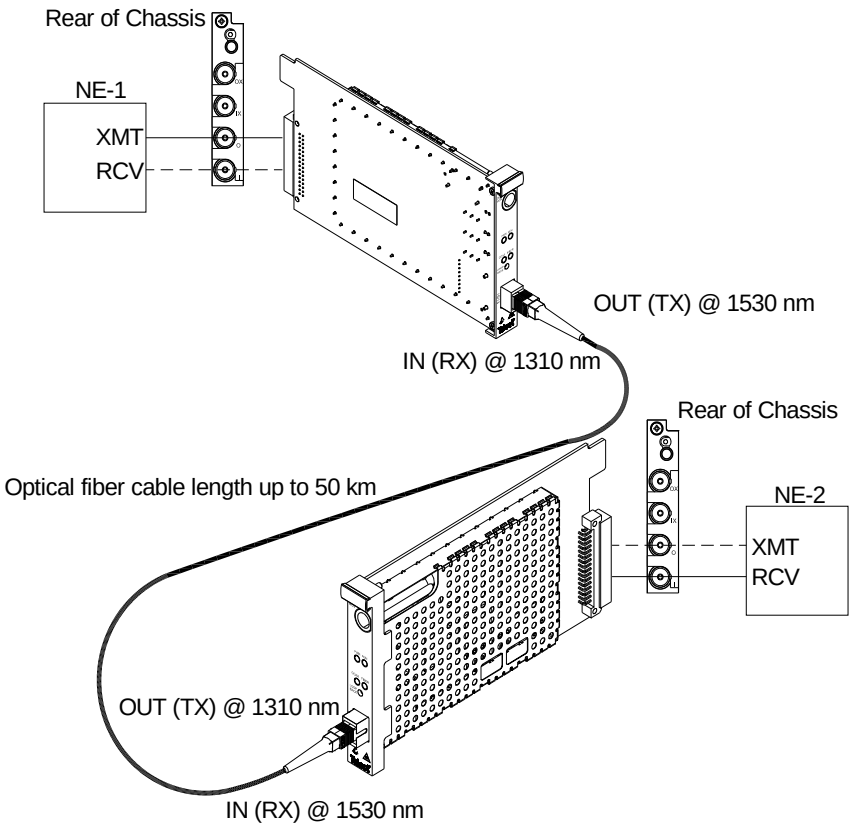

Figure 15 - Installing I/O cables

7. After having installed OTMs at both the local and remote ends of the optical linkup, remove the protective “dust-cover” plugs at the fronts of the OTMs and connect optical data link connectors (XMT and RCV) to the OTMs.
8. If applicable, route optical cables as specified in either Chapter 5 (BCSII with Vector Fiber Tray) or Chapter 6 (Standalone Wall-Mount chassis).

   For MIX SideCar and desk-mount applications, please refer to one of the following for power, alarm, and DS3 cabling:

   - **MIX 56 SideCar User Manual** (Telect Publication 124297)
   - **Vector Standalone Desk-Mount Chassis Installation Guide** (Telect Publication 128077)
9. Record the installation as required by company procedures.
10. Test using standard procedures in your operating company.

This procedure is complete.

2.6 Operation

2.6.1 Control & Status LEDs

2.6.1.1 Power (PWR) LED

- GREEN — BATT A and/or BATT B power is on.
- Off — BATT A and BATT B power are off.

2.6.1.2 Alarm (ALRM) LED

- RED (Solid) — Major alarm condition, either optical or electrical LOS, or both. (Also, the major alarm relay will close the normally open major alarm contacts to set the MAJ alarm signal, depending on ALM1 and/or ALM2.)

  The settings of ALM1 and ALM2 have no effect on the ALM LED.

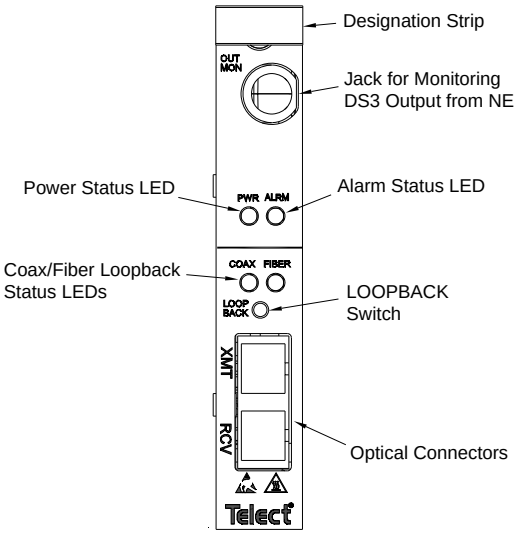

Figure 16 - OTM With Separate XMT and RCV SC Connectors)

- RED (Blinking) — Indicates that an alarm has been set at the far end.

  An electrical loss on one end will cause the ALM LED on that end to turn on solid and to send an all-ones signal to the other end. The ALM LED on that other end will blink indicating that the problem was detected at the far end.

  The status of the ALM3 setting has no effect on whether the ALM LED blinks on a far-end loss of signal.

- Off — No major alarms. The ALM LED goes off if the condition causing a major alarm is remedied.

If both local and far-end alarms occur, the ALM LED will light solid red. A local alarm will take priority over a remote alarm.

2.6.1.3 COAX LED

- GREEN — Electrical loopback mode. Electrical RCV input is internally looped back to electrical XMT output.
- Off — Not in coax loopback mode

2.6.1.4 FIBER LED

- GREEN — Fiber loopback mode. Optical RCV input is internally looped back to optical XMT output.
- Off — Not in fiber loopback mode

2.6.2 LOOPBACK Mode Switch

- Pressing the recessed **LOOPBACK** switch causes the OTM to switch from normal mode to fiber loopback. In the fiber loopback mode, the RCV optical input is internally routed to the XMT output of the same OTM.
- Pressing **LOOPBACK** a second time switches from fiber to coax loopback. In the coax loopback mode, the RCV electrical input is internally routed to the XMT input of the same OTM.
- Pressing **LOOPBACK** a third time returns the OTM to normal mode.

2.6.3 Alarm Relays

Alarm relays on the OTM cause normally open (NO) contacts to close on the local OTM. The contacts are connected to terminals on the rear of the chassis.

- A POWER FAIL alarm will occur for a power loss of 3.3 Vdc on *both* BATT A and BATT B. On power failure, the PWR LED will extinguish and the alarm relay de-energizes to close normally open (NO) contacts. The contacts are connected to ALM PWR and ALM COM (common) located on the rear of the chassis.
- A MAJOR alarm is used to indicate a loss of either electrical or optical signal.
  - Local loss of electrical signal will turn on the local ALRM LED. If the ALM1 switch is ON (closed), the loss of a local electrical signal will energize the major alarm relay controlling the ALM MAJ contact on the rear of the chassis.
  - If the local OTM detects a loss of optical signal, the local OTM turns on the ALRM LED. If the ALM2 switch is ON (closed), the loss of the optical signal will energized the major alarm relay controlling the ALM MAJ contacts on the rear of the chassis.

2.6.4 Monitoring

The monitor jack on the module faceplate accepts a mini-WECO jack plug. You can use this jack for nonintrusive monitoring of the OUT channel from the remote network element connected to the OUT connector (**O**) on the chassis backplane.

Chapter 3: Vector Basic OPM

3.1 Overview

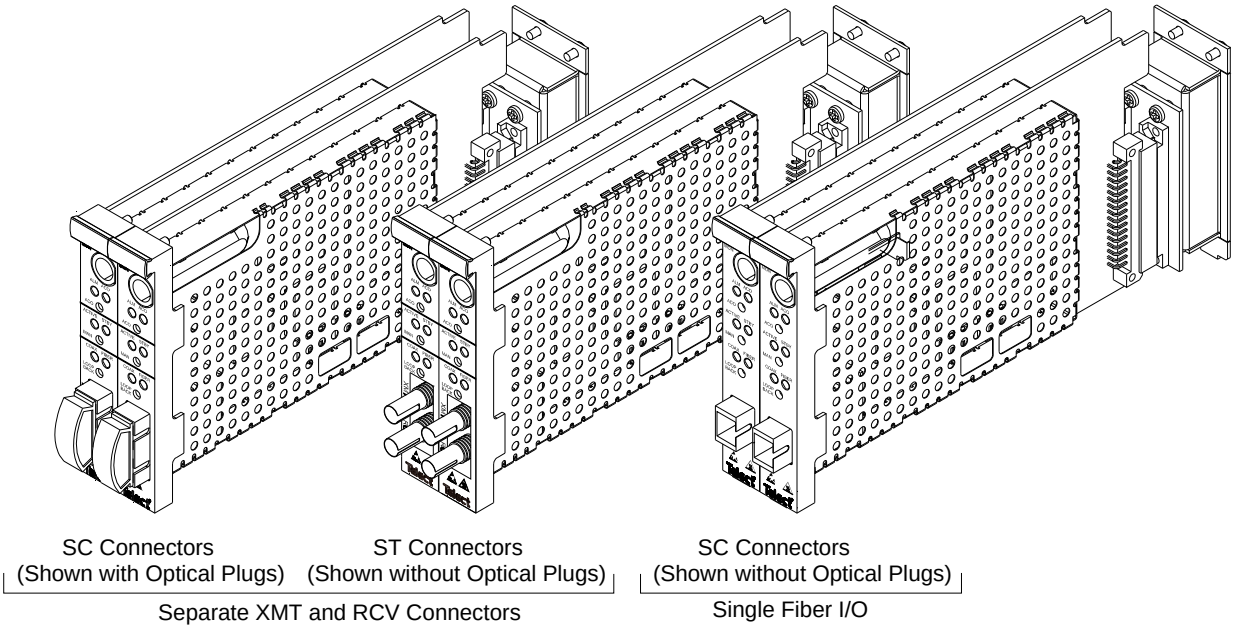

Figure 17 - Vector Basic OPM

OPMs plug into a special backplane that allows the twin OPMs to share the same network element I/O (RCV/XMT) signals at the rear of the chassis.

The chassis must have been previously modified either at the factory or on-site to accommodate this OPM pair:

- BSCII chassis, Desk-Mount, and MIX SideCar chassis are modified on-site to accommodate the special backplane.
- Standalone Wall-Mount chassis are modified at the factory to specifically accommodate twin OPMs.

  Once modified, either at the factory or on-site, those slots are practical only for OPMs. Although one basic OTM can be inserted in either OPM slot to function as a local or remote, unprotected terminus, the adjacent OPM slot at that terminus would have to remain empty.

Just as with OTMs on opposite ends of an optical data link, twin OPMs on the both ends of redundant optical data links should have the same circuit board switch settings. (The speed settings [E3, T3, STS-1] *must* be the same on all OTMs and OPMs at the ends of linkups.)

CAUTION

CAUTION! Only qualified technicians may install and maintain this product.

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ALERT

ALERT! These instructions presume you have verified that the Telect equipment being installed is compatible with the rest of the system, including power, ground, circuit protection, signal characteristics, equipment from other vendors, and local codes or ordinances.

3.2 Installation Tools & Equipment

You need only standard tools. Use listed components (UL-recognized, CSA, ETL, TUV agency) and tools.

3.3 Inspection

Compare the contents of the Vector OPM shipping container with the packing list. Call Telect if you are missing anything.

Telect is not liable for shipping damage.

If the shipping container is damaged, keep it for the carrier's inspection. Notify the carrier and call Telect's Customer Service Department: 1-800-551-4567 or 1-509-926-6000.

Keep the container until you have checked equipment operation. If you experience any kind of problem, call Telect's Customer Service Department. Use the original, undamaged container if you are instructed to return the Vector OPM to Telect.

3.4 Installation Setup — Setting PCB Switches

ALERT

ALERT! The modules are sensitive to static. Wear a grounded wrist strap and perform any other available ESD procedures when handling them.

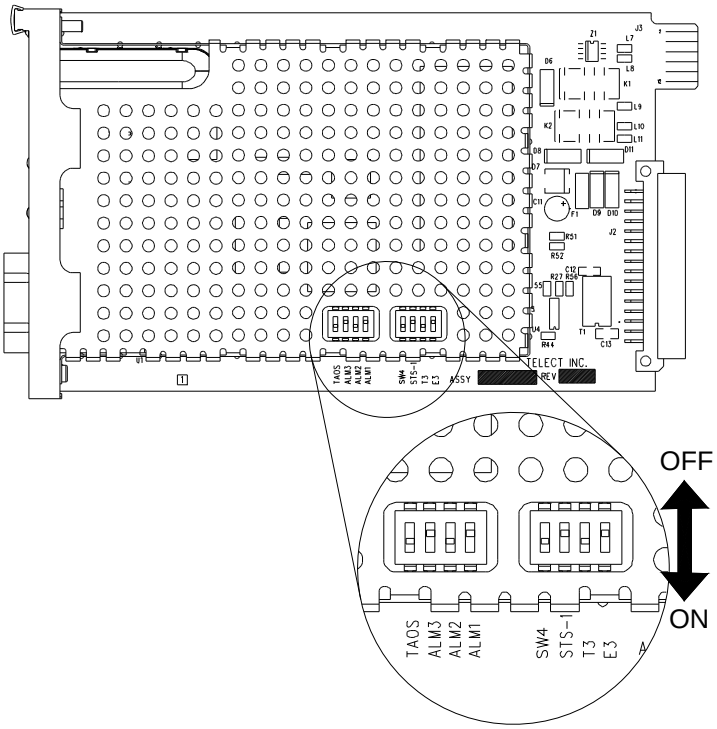

Figure 18 - Setting PCB Switches

PCB Switches	ON	OFF
E3*	E3 rate selected	Not selected
T3*	T3 rate selected (default)	Not selected
STS-1*	STS-1 rate selected	Not selected
SW4	—— not used ——	
ALM1	Major Alarm Contacts Close on Local Loss of Optical Signal	Major Alarm Relay Unaffected by Loss of Optical Signal
ALM2	Major Alarm Contacts Close on Local Loss of Electrical Signal	Major Alarm Relay Unaffected by Loss of Electrical Signal
ALM3	Major Alarm Contacts Close on Far-End Loss of Signal**. Optical LOS Causes OPM to Transmit Optical All One Alarm Signal to Far-End.OPM	Major Alarm Relay Unaffected by Far-End Loss of Signal**. Optical All Ones Alarm Signal is Not Transmitted on an Optical LOS.
TAOS	Transmit an Electrical All-Ones Alarm Signal on Local Loss of Optical Signal	No Electrical All-Ones Signal is Sent on an Optical Loss of Signal
*Only one of these can be selected. If none selected, Vector defaults to T3. **Far-end loss of signal is detected by locally receiving an all-ones optical signal.		

3.5 Installation

ALERT

ALERT! The modules are sensitive to static. Wear a grounded wrist strap and perform any other available ESD procedures when handling them.

OPMs may be installed in any pair of slots in a 19- or 23-in. BCSII chassis, or in an OPM Standalone Wall-Mount or Desk-Mount chassis, or in a Telect MIX 56 SideCar chassis. When installing less than a full complement of OPMs in a BCSII chassis, the extreme right or left end of the chassis is best for heat dissipation.

The temperature at the face plate of an OPM can rise to 49°C (120°F) at an ambient of 19°C (66°F). If you fully load a BCSII chassis with OPMs, consider the effect that heat may have on other shelves above the full-loaded OPM BCSII. If necessary, either leave 2RU (Either leave vacant or install shelves that dissipate no heat.) of space above that BCSII chassis for heat dissipation or install a 1RU Telect heat baffle above that BCSII chassis.
(See Chapter 8, “Accessories.”)

The subsections that follow *briefly* describe the installation process for a BCSII Chassis, Wall-Mount Chassis, Desk-Mount Chassis, and a SideCar Chassis. Complete installation and cabling procedures are provided along with the Vector products.

3.5.1 Installing OPM in a BCSII Chassis

OPM installation in a BSCII chassis involves removing a pair of adjacent BNC backplane modules at the rear of the chassis and replacing those with a single BNC port panel with a backplane that accommodates an adjacent pair of OPMs.

1. See the preceding tables and set the circuit board switches on both Vector OPMs.

   Remember: The switch setting should be the same on both OPMs and should match those at the opposite end of the optical link. The speed settings *must* be identical.

2. See the following illustrations and remove two side-by-side BNC backplane modules on rear of the BCSII.

   Remember: The BNC backplane modules must be at an odd-numbered slot and the next *higher*, even-numbered slot.

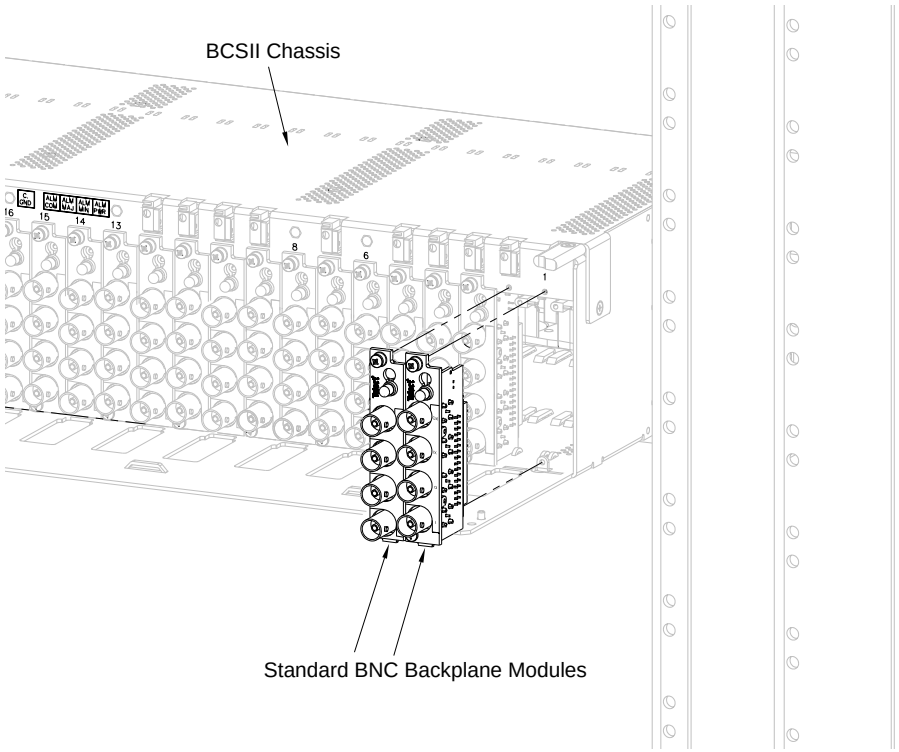

Figure 19 - Removing Standard BNC Backplane Modules from BCSII Chassis

3. See the following illustration and install the OPM I/O port panel.

   Tabs at the bottom of the panel slip into receiver slots in the bottom of the chassis, and two screws secure the panel assembly at the top.

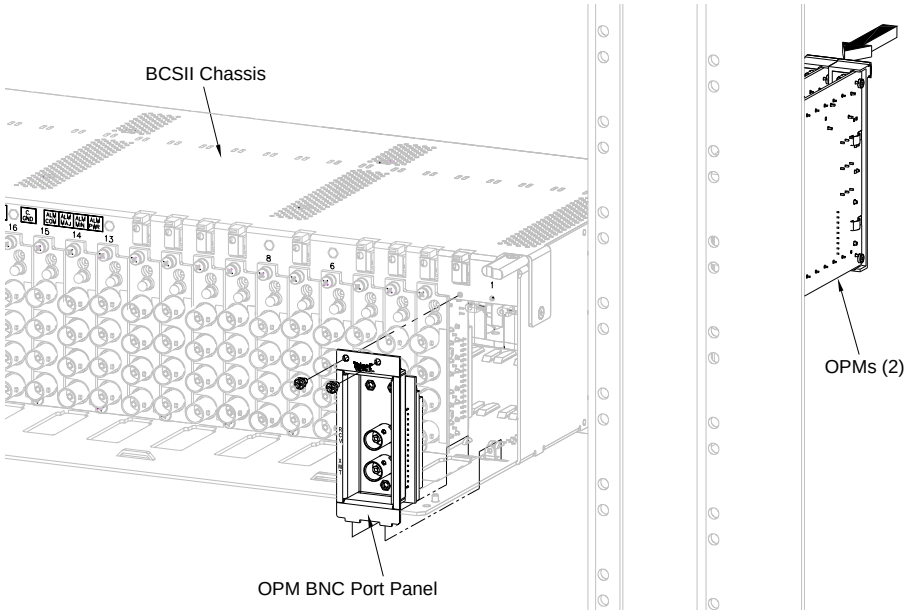

Figure 20 - Installing OPM BNC Port Panels on BCSII Chassis

4. Slide an OPM into the chassis card guides of the *right-hand slot* and press into interior connectors of OPM port panel.

NOTES:

- If power is already supplied to the chassis, the first OPM into the chassis becomes the default active OPM.
- If power is off, the OPM on the right is chosen as the default active OPM when power is turned on.

5. Secure with top screw on OPM faceplate.
6. Connect I/O BNC cables from the network element to the XMT/RCV ports on the OPM port panel. (See illustrations on the following pages.)
7. Install an OPM in the left-hand slot. Secure the top screw and connect network element.
8. After having installed OPMs in OPM port panels at both the local and remote ends of the link-up, remove the protective “dust cover” plugs at the fronts of the OPMs and connect optical data link cables.

NOTES:

- **For OPMs with Separate XMT and RCV,** connect XMT on the right-hand local OPM to RCV on the right-hand remote OPM. Likewise, connect left-hand local to left-hand remote.
- **For Single Fiber XMT/RCV**, connect the two OPMs with a single cable. Make sure that the two Single-Fiber OPMs are a complementary pair: one must have “15/13” (for 1510

and 1310 nm respectively) and the other must have “13/15” printed next to the SC connector.

9. Route cables as specified in Chapter 5 (BCSII with Vector Fiber Trays) or Chapter 6 (Stand-alone Wall-Mount chassis).
10. If and when power is supplied to the chassis — assuming that the OPMs were installed as prescribed — the right-hand set of OPMs will automatically become the active optical link and the left-hand set will be the standby:
    - The ACTIVE LED on the front panel of the right-hand OPMs will be lit green.
    - The STANDBY LEDs on the front panel of the left-hand OPMs will be lit green.
11. If you intend that the left set of OPMs define the active link, press the recessed MAN switch on one of the *active* OPMs.

    The corresponding OPM on the other end of the data link will automatically switch active states.

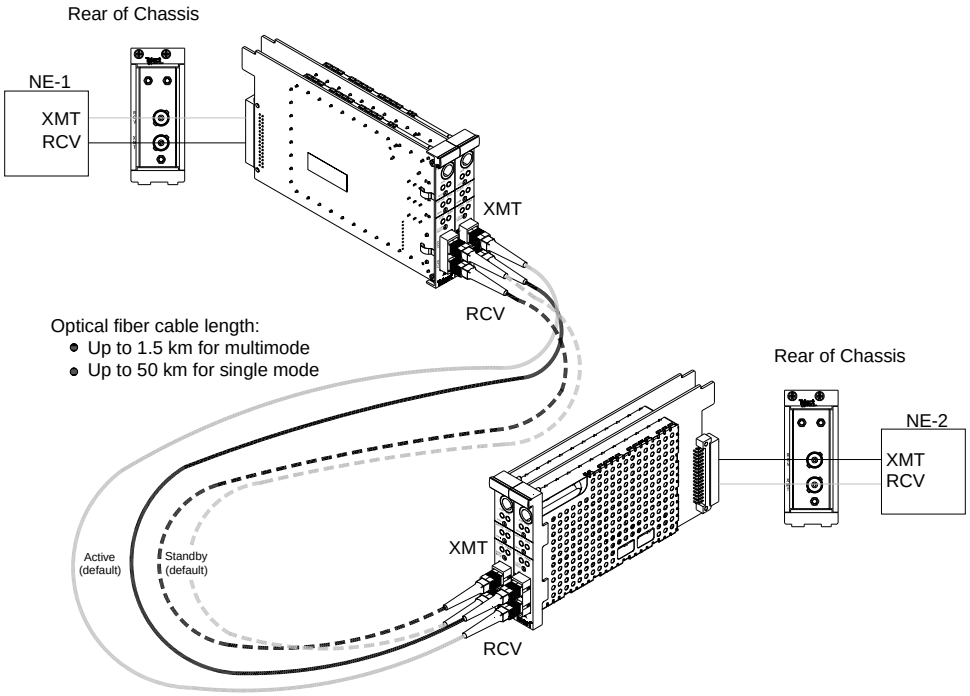

Figure 21 - OPM Connection

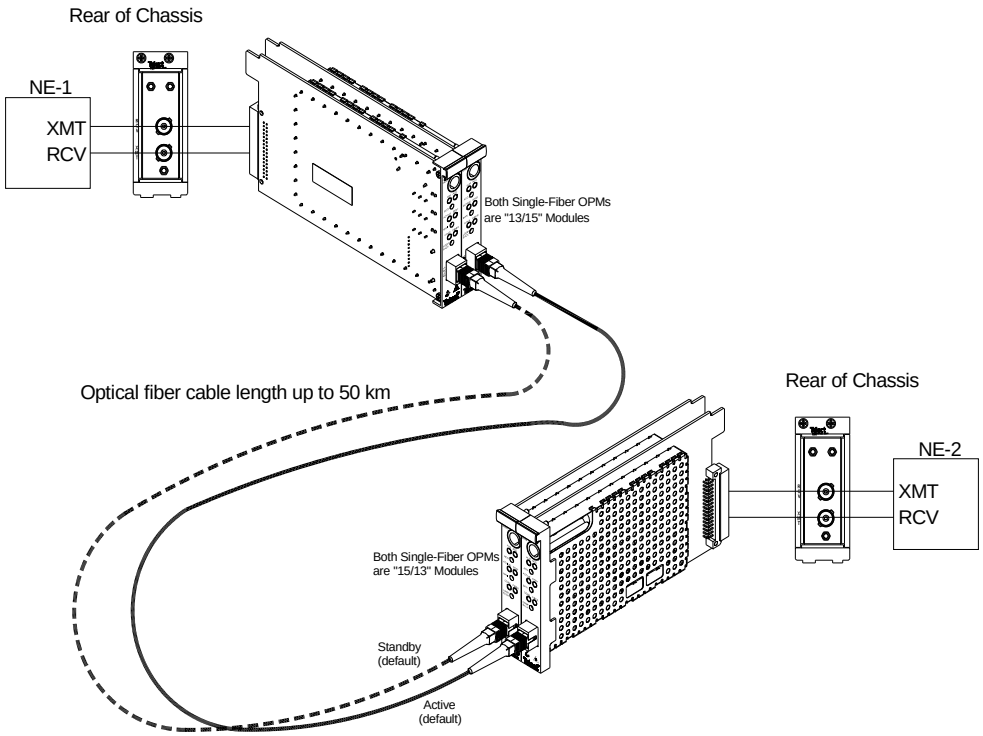

Figure 22 - OPM Connection

3.5.2 Installing a Standalone Wall-Mount OPM

The Standalone Wall-Mount OPM chassis consists of a wall plate holding a dual- slot chassis with two installed OPMs. Use three #8 screws (not supplied) to secure unit to wall-mounted rails or plywood, as shown in the following illustration. See Chapter 6 for cabling.

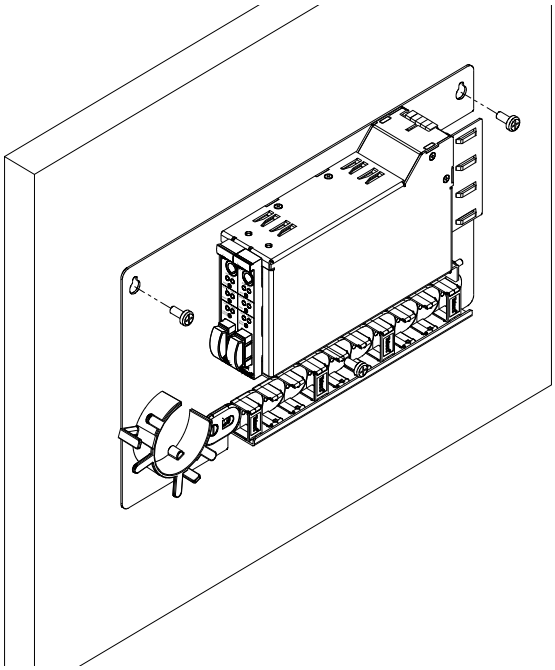

Figure 23 - Standalone Wall-Mount OPM Chassis

3.5.3 Installing OPMs in a MIX 56 or MIX 28 SideCar Chassis

Refer to the **MIX 56 SideCar User Manual** (Telect Publication 124297) along with the installation guide accompanying the OPMs for details and variations on installing SideCar chassis, OPM backplane, OPMs, and power, alarm, and DS3 cabling.

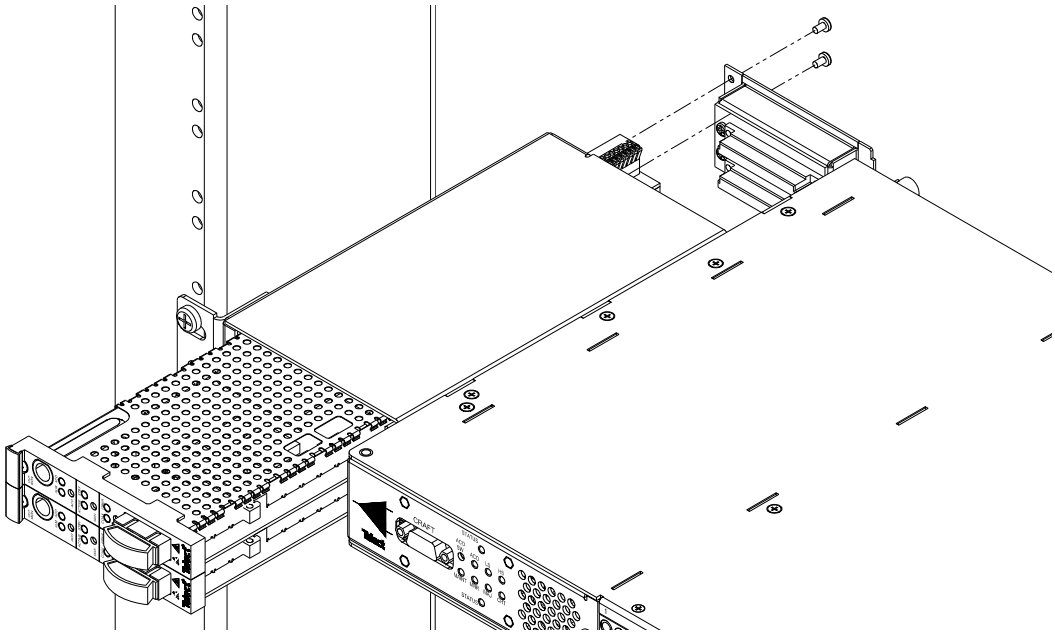

Figure 24 - MIX 28 SideCar OPMs

3.5.4 Installing OPMs in a Standalone Desk-Mount Chassis

Refer to the **Vector Standalone Desk-Mount Chassis Installation Guide** (Telect Publication 128077) along with the installation guide accompanying the OPMs for details and variation on installing OPM backplanes, OPMs, and power, alarm, and DS3 cabling.

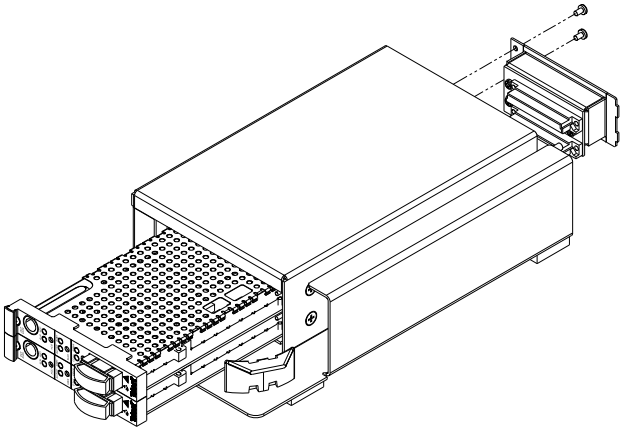

Figure 25 - Standalone Desk-Mounted OPMs

3.6 Operation

3.6.1 Control & Status LEDs

3.6.1.1 ACTIVE LED

- GREEN — OPM is active.
- Off — OPM is not the designated active OPM.

3.6.1.2 Standby (STBY) LED

- GREEN — OPM is standby.
- Off — OPM is not the designated standby OPM

3.6.1.3 COAX LED

- GREEN — Electrical loopback mode. Electrical RCV input is internally looped back to electrical XMT output.
- Off — Not in coax loopback mode

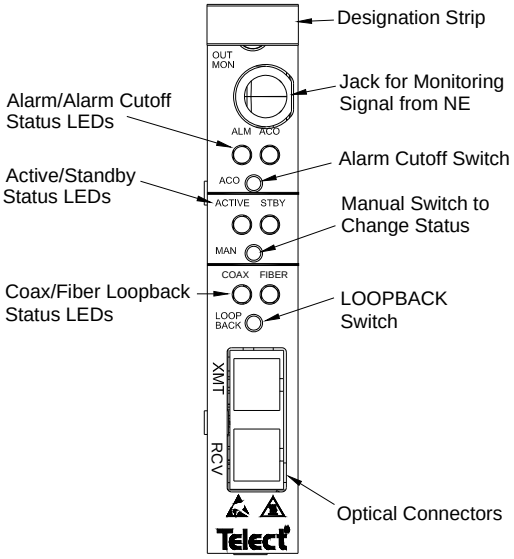

Figure 26 - OPM With Separate XMT & RCV SC Connectors

3.6.1.4 FIBER LED

- GREEN — Fiber loopback mode. Optical RCV input is internally looped back to optical XMT output.
- Off — Not in fiber loopback mode

3.6.1.5 Alarm (ALM) LED

- RED (Solid) — Major alarm condition, either optical or electrical LOS, or both. The major alarm relay will close the normally open major alarm contacts to set the MAJ alarm signal, depending on ALM1 and ALM2.

  The settings of ALM1 and ALM2 have no effect on the ALM LED.

- RED (Blinking) — Indicates that an alarm has been set at the far-end alarm.

  An electrical loss on one end will cause the ALM LED on that end to turn on solid and to send an all-ones signal to the other end. The ALM LED on that other end will blink indicating that the problem was detected at the far end.

  The status of the ALM3 setting has no effect on whether the ALM LED blinks on a far-end loss of signal.

- Off — No major alarms. The ALM LED goes off if the condition causing a major alarm is remedied.

  If both local and far-end alarms occur, the ALM LED will light solid red. A local alarm will take priority over a remote alarm.

3.6.1.6 Alarm Cut-Off (ACO) LED

- GREEN — Major alarm has occurred but the MAJ alarm contact closure has been turned off because the ACO switch has been depressed.

  The ACO switch affects the MAJ alarm broadcast by a relay switch closure. The ACO switch has no effect on the ALM LED.

- Off — ACO switch has not been used to reset a MAJ alarm signal.

3.6.2 Mode Switches

3.6.2.1 Loopback Mode

- Pressing the recessed **LOOPBACK** switch causes the OPM to switch from normal mode to fiber loopback. In the fiber loopback mode, the RCV optical input are internally routed to the XMT output of the same OPM.
- Pressing the **LOOPBACK** switch a second time switches from fiber to coax loopback. In the coax loopback mode, the RCV input is internally routed to the XMT output of the same OPM.
- Pressing the **LOOPBACK** switch a third time returns the OPM to normal mode.

3.6.2.2 Manual Mode

Pressing the recessed MAN switch on the *active* OPM changes the OPM from active to standby status. (The MAN switch is enabled only on the active OPM. Pressing the MAN switch on the standby OPM has no effect.)

Manually switching modes causes the OPM on the other end of the optical link to switch active modules.

Regardless of the manually set active-versus-standby status of the data links, the data links will change status automatically if an OPM on the active link detects a loss of optical signal (LOS). The switchover only occurs if the standby optical data link and OPMs are operational and do not detect an optical LOS.

If the TAOS switch is ON (closed) at the time of a LOS, the OPM will transmit an electrical all-ones signal.

3.6.2.3 Alarm Cut-Off Mode

A loss of either electrical or optical signal on one end causes the ALM LED to light on that end and may cause the ALM LED to blink on the other end. In addition, depending on the status of the ALM1, ALM2, and ALM3 switches, the local alarm will energize the major alarm relay on the OPM causing a normally open contact to close, in turn, causing electrical continuity across the ALM MAJ and ALM COM terminals on the back of the chassis. When the contacts close, the alarm signal at ALM MAJ is shunted to signal ground.

The recessed alarm cut-off (ACO) switch resets (de-energizes) the major alarm relay.

The ACO switch does not affect the ALM LED or the ALM PWR relay.

3.6.3 Alarm Relays

Alarm relays on the OPM cause normally open (NO) contacts to close on the local OPM. The contacts are connected to terminals on the rear of the chassis.

- A POWER FAIL alarm will occur for a power loss of 3.3 Vdc. A relay de-energizes and closes normally open (NO) contacts. ALM PWR and ALM COM (common) are located on the rear of the chassis.
- A MAJOR alarm is used to indicate a loss of either electrical or optical signal.
  - Local loss of electrical signal will turn on the local ALM LED. If the ALM1 switch is ON (closed), the loss of a local electrical signal will energize the major alarm relay controlling the ALM MAJ contact on the rear of the chassis.
  - If the local OPM detects a loss of optical signal, the local OPM turns on the ALM LED. If the ALM2 switch is ON (closed), the loss of the optical signal will energized the major alarm relay controlling the ALM MAJ contacts on the rear of the chassis.

3.6.4 Monitoring

The monitor jack on the module faceplate accepts a mini-WECO jack plug. You can use this jack for nonintrusive monitoring of the OUT channel from the remote network element connected to the OUT connector (**O**) on the chassis backplane.

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Chapter 4: E-Vector OTM

4.1 Overview

NOTE: Shown without protective "dust cover" plugs. All Vector products include plugs.

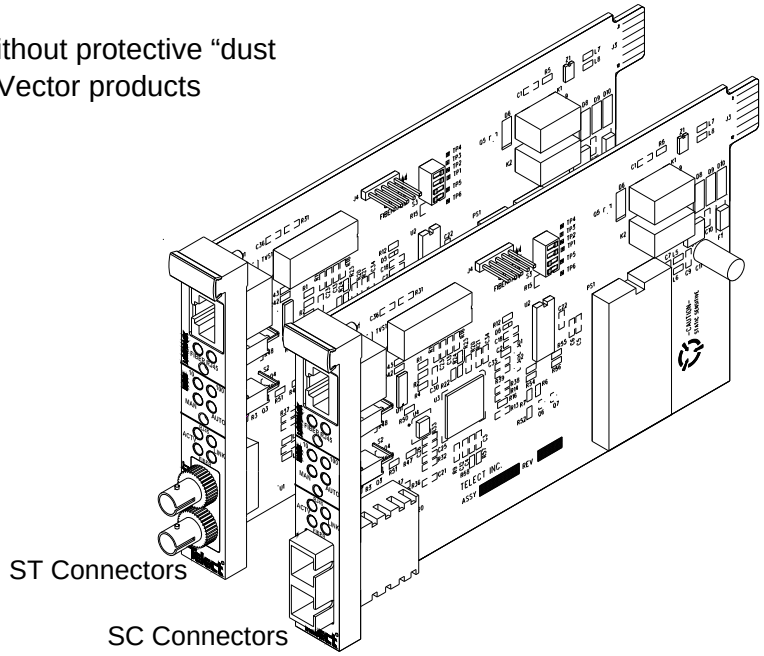

Figure 27 - E-Vector OTMs

ALERT

ALERT! These instructions presume you have verified that the Telect equipment being installed is compatible with the rest of the system, including power, ground, circuit protection, signal characteristics, equipment from other vendors, and local codes or ordinances.

CAUTION

CAUTION! Only qualified technicians may install and maintain this product.

4.2 Installation Tools & Equipment

You need only standard tools. Use listed components (UL-recognized, CSA, ETL, TUV agency) and tools.

4.3 Inspection

Compare the contents of the E-Vector OTM shipping container with the packing list. Call Telect if you are missing anything.

Telect is not liable for shipping damage.

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If the shipping container is damaged, keep it for the carrier's inspection. Notify the carrier and call Telect's Customer Service Department: 1-800-551-4567 or 1-509-926-6000.

Keep the container until you have checked equipment operation. If you experience any kind of problem, call Telect's Customer Service Department. Use the original, undamaged container if you are instructed to return the E-Vector OTM to Telect.

4.4 Installation Setup — Setting PCB Switches

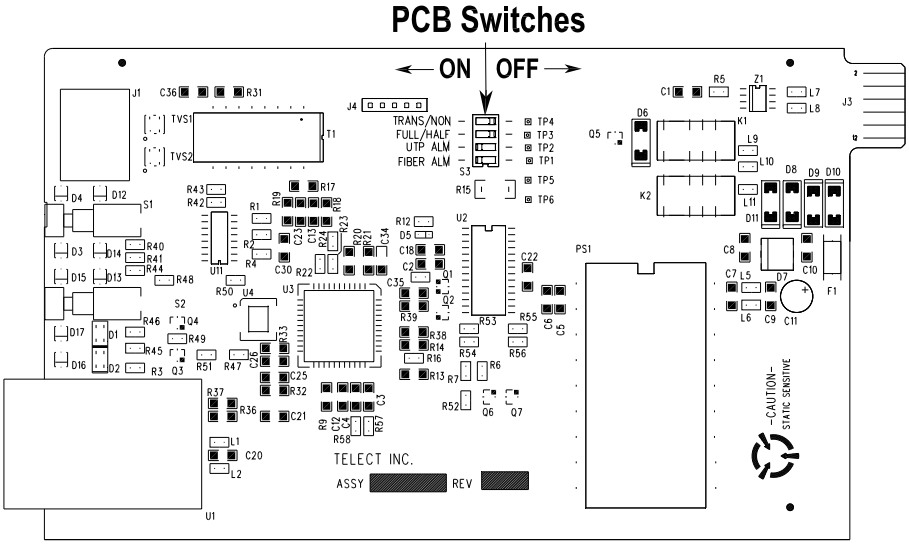


Figure 28 - Setting PCB Switches

PCB Switches	On	OFF
TRANS/NON[1,]	Transparent Auto Mode	Non-Transparent Auto Mode
FULL/HALF[1,2]	Full Duplex	Half Duplex
UTP ALM[3]	Major Alarm Occurs if Electrical Ethernet Link is Lost	No Major Alarm if Electrical Ethernet Link is Lost
FIBER ALM	Major Alarm Occurs if Optical Signal is Lost	No Major Alarm if Optical Signal is Lost

1. Switches TRANS/NON and FULL/HALF are only functional in "Auto" operational model. Auto mode is set with the MAN/AUTO switch on the front of the module.
2. Switch FULL/HALF is only functional if switch TRANS/NON is off, that is, set to the Non-Transparent Auto Mode, meaning that the Auto mode's auto negotiation is non-transparent.
3. "UTP" (unshielded twisted pair) refers to the electrical connection, which in this case is an RJ45 connection. (RJ45s are not unshielded twisted pairs.)

4.5 Installation

ALERT

ALERT! The modules are sensitive to static. Wear a grounded wrist strap and perform any other available ESD procedures when handling them.

NOTE: E-Vector OTMs may be installed in any or all slots in a 19-in. or 23-in. BCSII, MIX SideCar, Wall-Mount, or Desk-Mount chassis.

1. Before installing the E-Vector module in an enclosure or chassis, check and, if necessary, change the settings of the switches located near the top, right side of the printed circuit board, shown in the preceding illustration.
2. If applicable, remove blank cover on front of SideCar, Wall-Mount, or Desk-Mount chassis.
3. Install the module, as shown in the following illustrations.

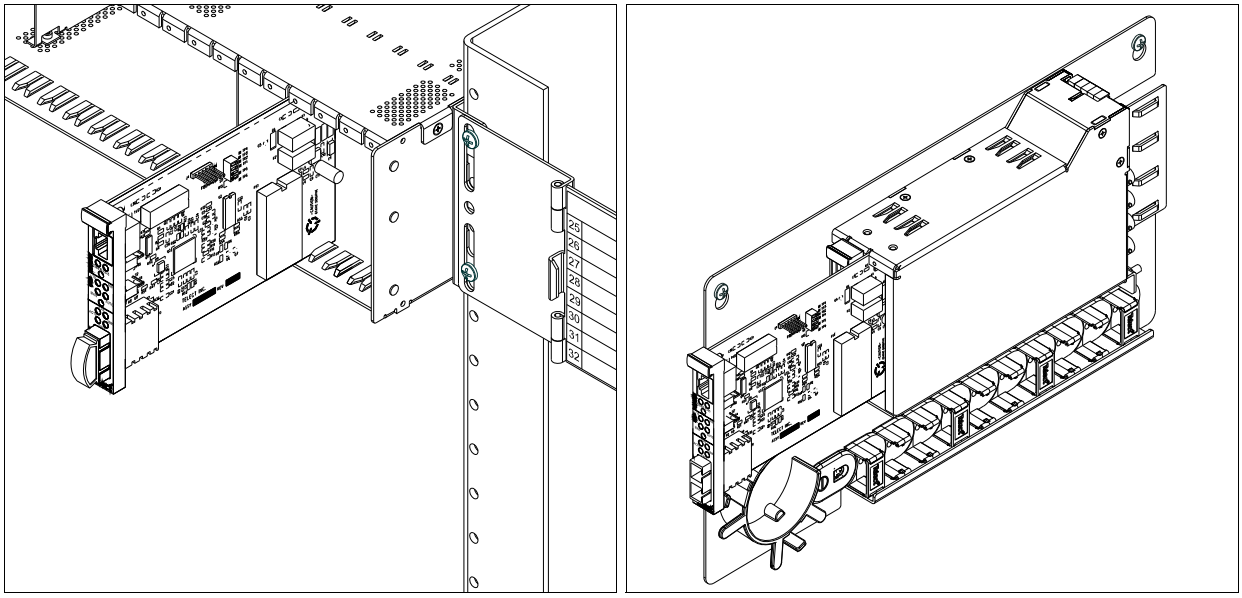


Figure 29 - BCSII Chassis (Model 010-0000-3201BCS) on the left & Wall-Mount Chassis (Model 710-1001-2302-E) on the right

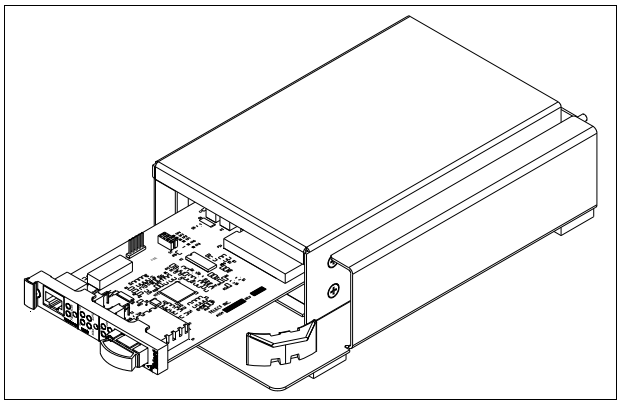


Figure 30 - Desk-Mount Chassis (Model 747-0000-1001)

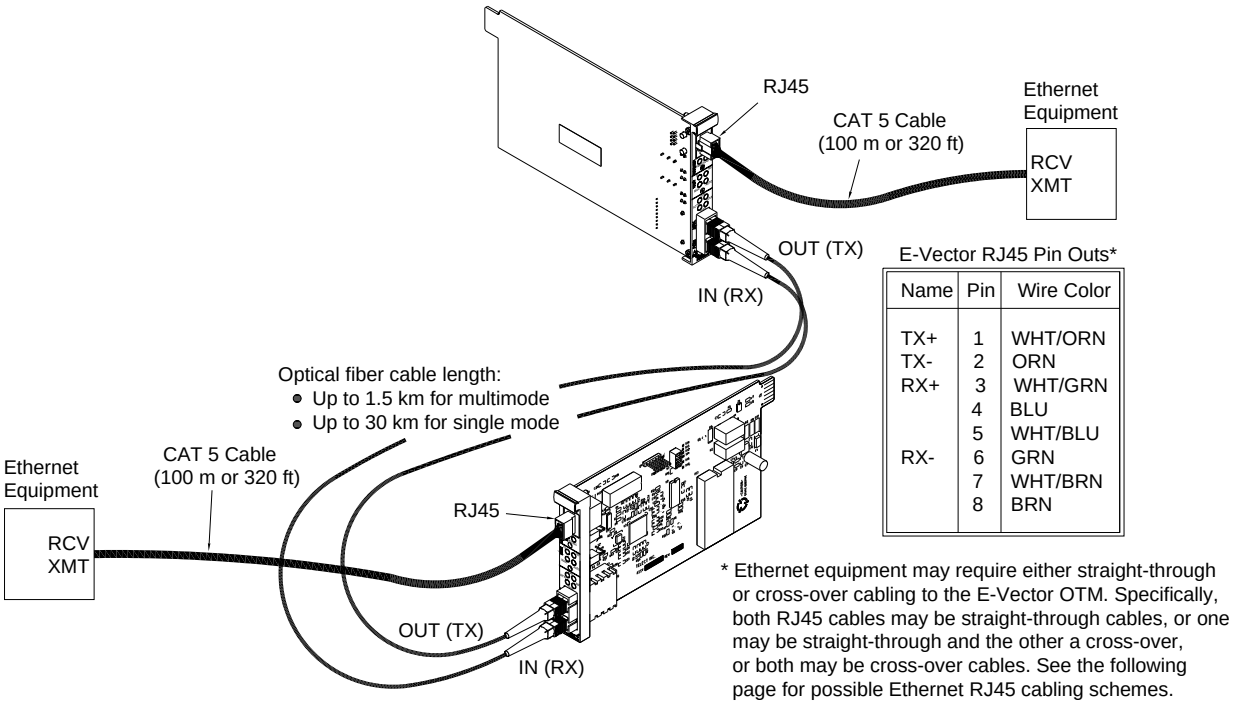
4. If power is supplied to the panel or chassis, set the **LOOPBACK** and **MAN/AUTO** switches on the front of the module.

   Both switches are multi-toggle pushbutton switches: each time someone pushes the switch, the E-Vector OTM will change operating parameters indicated by green LEDs directly above the switch.

- Pressing the **LOOPBACK** switch toggles among the following three modes of operation: (Loopbacks are done internally without requiring external cables.)
  - **Normal Operation**, both FIBER and RJ45 LEDs off.
  - **Fiber Loopback**, FIBER LED on.
  - **RJ45 Loopback**, RJ45 LED on.
- Pressing the **MAN/AUTO** switch toggles between three operational RJ45 modes: (See 47 for a description of these modes.)
  - **Auto**, the AUTO LED is on.
  - **Manual @ 100 Mbps**, the MANUAL and 100 LEDs are on.
  - **Manual @ 10 Mbps**, the MANUAL and 10 LEDs are on.

    Without having installed RJ45 and fiber connections, the RJ45 and FIBER LINK Status LEDs will be red. All other LEDs will be off.

5. Install the RJ45 connection at the top of the front panel. (See the following network illustration.)


RJ45
Ethernet Equipment
CAT 5 Cable (100 m or 320 ft)
RCV XMT
OUT (TX)
IN (RX)
E-Vector RJ45 Pin Outs*
Optical fiber cable length:
Up to 1.5 km for multimode
Up to 30 km for single mode
Ethernet Equipment
CAT 5 Cable (100 m or 320 ft)
RCV XMT
RJ45
OUT (TX)
IN (RX)
* Ethernet equipment may require either straight-through or cross-over cabling to the E-Vector OTM. Specifically, both RJ45 cables may be straight-through cables, or one may be straight-through and the other a cross-over, or both may be cross-over cables. See the following page for possible Ethernet RJ45 cabling schemes.

Name	Pin	Wire Color
TX+	1	WHT/ORN
TX-	2	ORN
RX+	3	WHT/GRN
	4	BLU
	5	WHT/BLU
RX-	6	GRN
	7	WHT/BRN
	8	BRN

Figure 31 - Network Connections

6. Remove the protective “dust cover” plug from the optical ports and install the transmit (XMT) and receive (RCV) optical cables at the bottom of the front panel.

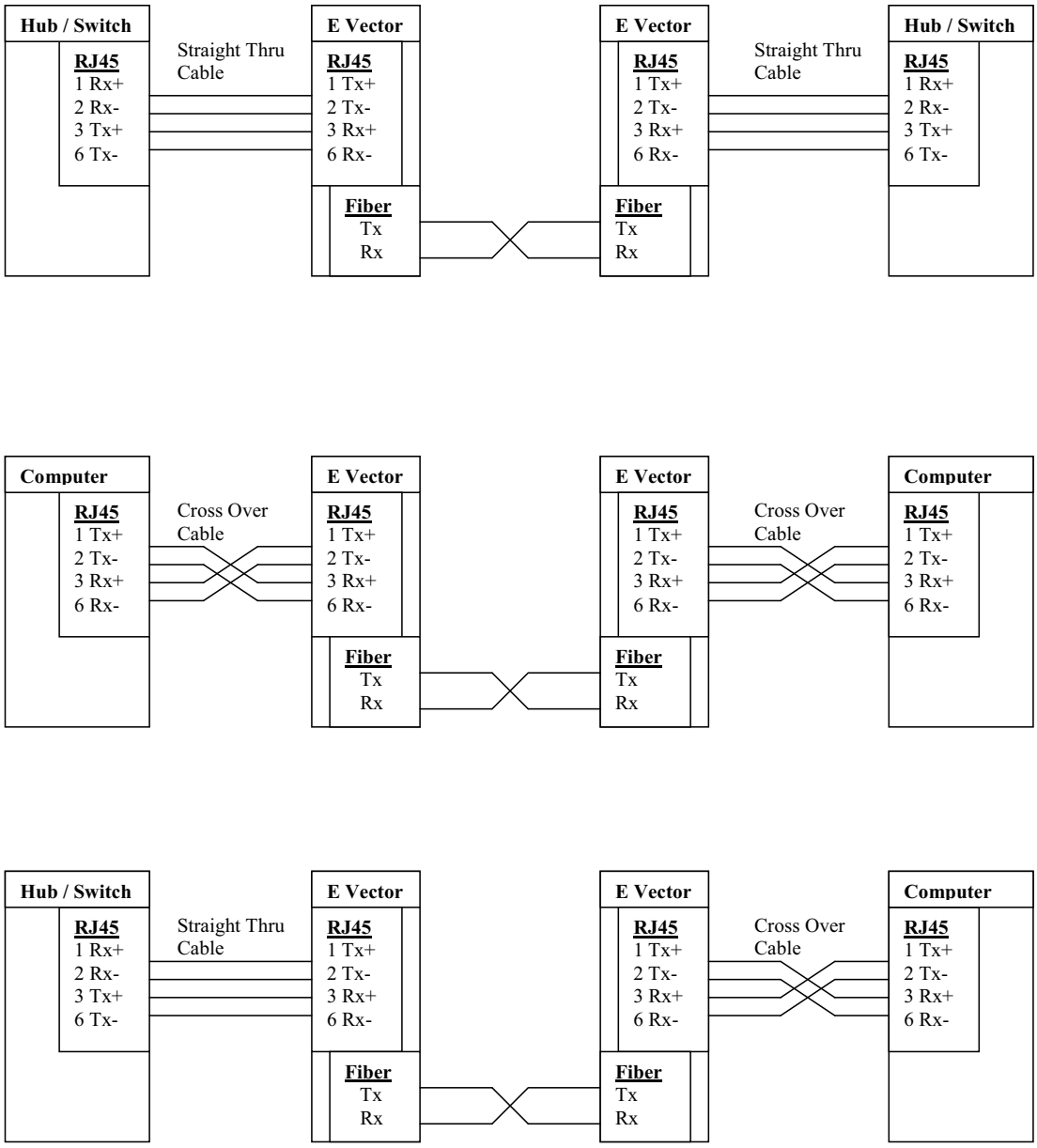


Figure 32 - Ethernet Cabling Schemes

4.6 Operation

4.6.1 Status LEDs

During operation, expect that

- RJ45 LINK LED will light green as long as the RJ45 communication link is enabled.
- RJ45 ACTV LED will light (or flicker) green whenever the RJ45 interface is active, that is, whenever data packets are present on the RJ45 interface. Either the “10” or “100” LED will be lit to indicate a data rate of either 10 Mbps or 100 Mbps.
- FIBER LINK LED will light green as long as the fiber communication link is enabled.
- FIBER ACTV LED will light (or flicker) green whenever the fiber interface is active, that is, whenever data packets are present on the fiber transmit/receive lines.

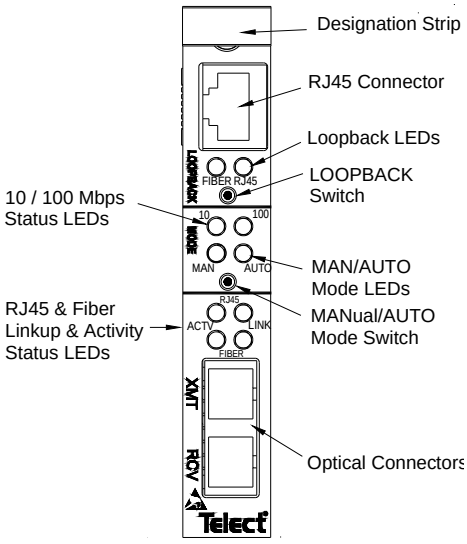


Figure 33 - E-Vector OTM

4.6.2 Alarms

- A POWER FAIL alarm will occur for a power loss of 3.3 Vdc. A relay de-energizes and closes normally open (NO) contacts. PWR FAIL NO and C (common) are located on the chassis.
- A MAJOR alarm is used to indicate a loss of either electrical (RJ45) or fiber link status.
  - Loss of electrical signal will cause a MAJOR alarm only if the UTP ALM switch on the circuit board is set ON.
  - Loss of fiber link status will cause a MAJOR alarm only if the FIBER ALM switch on the board is set ON.

When a major alarm occurs, a relay energizes and closes normally open (NO) contacts. MAJOR NO and C (common) are located on the chassis.

4.6.3 Mode Switches

4.6.3.1 Loopback Mode

Pressing the **LOOPBACK** switch toggles among the following three modes of operation: (Loopbacks are performed internally, without requiring external cables.)

- **Normal Operation**, both FIBER and RJ45 LEDs are off.
- **Fiber Loopback**, FIBER LED is on.
- **RJ45 loopback**, RJ45 LED is on.

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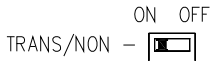
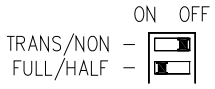
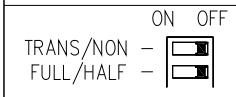
4.6.3.2 Manual/Auto Modes

Pressing the **MAN/AUTO** switch toggles among three operational modes:

- **Auto**, the AUTO LED is on
- **Manual @ 100 Mbps**, the MANUAL and 100 LEDs are on.
- **Manual @ 10 Mbps**, the MANUAL and 10 LEDs are on.

In Auto Mode, the function is determined by the settings of PCB dip switches TRANS/NON and FULL/HALF (shown on 42), as follows:

PCB Switches	Auto Mode	Description
	Transparent	E-Vector doesn't generate auto negotiations, but simply passes along the negotiations between the fiber and RJ45 sides of the link. Use Transparent mode when ***both*** sides of the fiber-RJ45 link are capable of auto negotations.
	Non-Transparent Full Duplex	E-Vector generates auto negotiations on the RJ45 link using the advertised 10 and 100Mbps speeds in full and half duplex auto negotiations. Use Non-Transparent Full Duplex mode when ***only*** the RJ45 side is capable of auto negotations in either full or half duplex operation.
	Non-Transparent Half Duplex	E-Vector generates auto negotiations on the RJ45 link using the advertised 10 and 100Mbps speeds in half duplex auto negotiations. Use Non-Transparent Half Duplex mode when ***only*** the RJ45 side is capable of auto negotations, but in half duplex ***only***.

In Manual Mode, auto negotiations is disabled; E-Vector will not pass along auto negotiations. Consequently, the speed is always the selected 10 or 100 Mbps and the duplex mode is either the established full or half-duplex.

Chapter 5: BCSII Vector Fiber Tray

5.1 Overview

Telect's BCSII Vector Fiber Trays are used with standard Telect BCSII chassis containing Vector optical modules, such as Telect's Optical Transport Modules (OTMs) and Optical Protected Modules (OPMs) — both being bi-directional optical/electrical converter.

The fiber tray consists of a front-mounted chassis tray containing fiber optic links or spools. The tray is attached to an integral panel bracket used in place of the standard WECO or EIA, 19-in. or 23-in. BCSII rack brackets:

- The articulated links are used on 19-in. or 23-in., 2RU BCSII chassis with *vertically mounted* modules.
- The spools are used on 19-in. or 23-in., 1RU BCSII chassis with *horizontally mounted* modules. (The illustration on the cover of this publication shows a Vector Fiber Tray [Model 010-0019-0471] attached to a BCSII 8-Place Horizontal Chassis [Model 010-0000-0471BCS].)

The table that follows cross-references Telect Vector Fiber Trays with Vector-applicable Telect BCSII chassis.

BCSII Chassis		Applicable Vector Fiber Tray
Model	**Description**	
010-0000-0471BCS or -0472BCS	8-Module, 19 in., Horizontal	010-0019-0471BCS
010-0000-1471BCS or -1472BCS	10-Module, 23 in., Horizontal	010-0023-1471BCS
010-0000-2401BCS or -2405BCS	24-Module, 19 in., Vertical	010-0019-2401BCS
010-0000-1401BCS	24-Module, 23 in., Vertical	010-0023-3201BCS
010-0000-3201BCS or -3216BCS	32-Module, 23 in. Vertical	010-0023-3201BCS

The illustrations that follow show how fiber-optic network element cables are routed through and around the trays' links and spools.

! ALERT

ALERT! Only qualified technicians may install this product.

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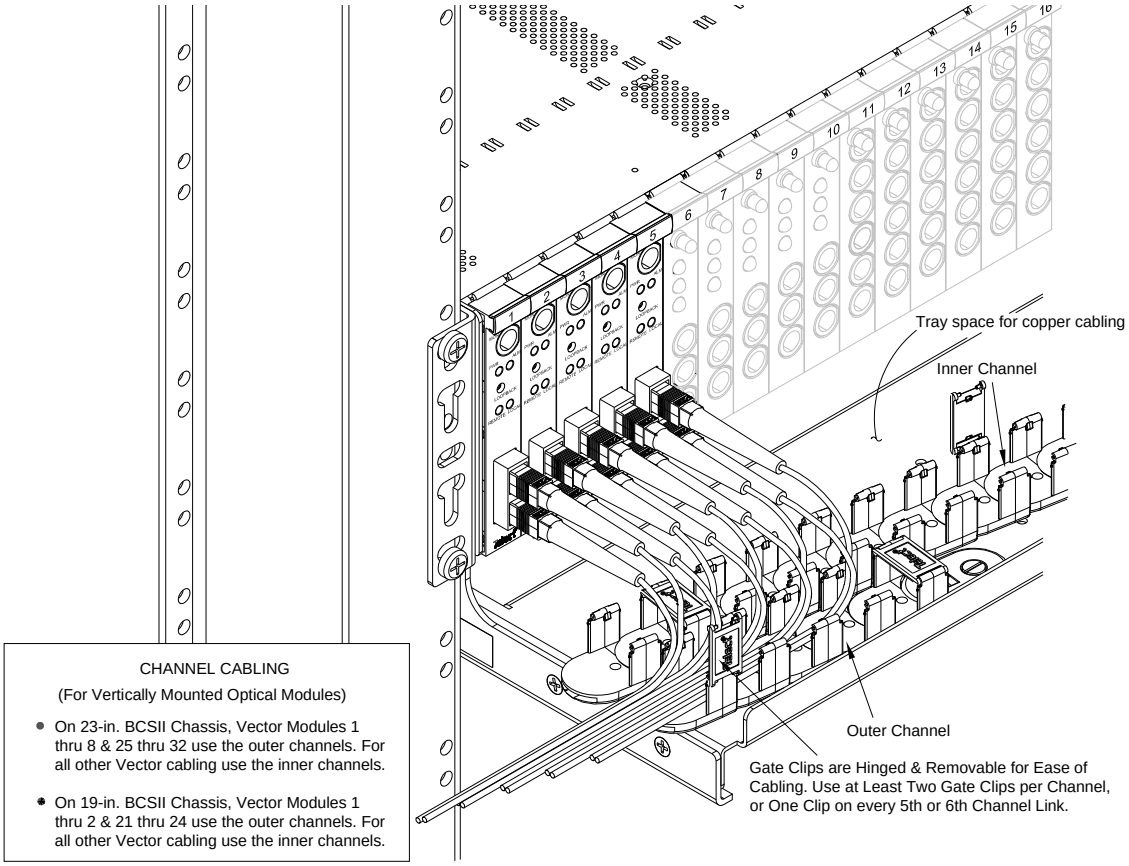

CHANNEL CABLING
(For Vertically Mounted Optical Modules)
On 23-in. BCSII Chassis, Vector Modules 1 thru 8 & 25 thru 32 use the outer channels. For all other Vector cabling use the inner channels.
On 19-in. BCSII Chassis, Vector Modules 1 thru 2 & 21 thru 24 use the outer channels. For all other Vector cabling use the inner channels.
Tray space for copper cabling
Inner Channel
Outer Channel
Gate Clips are Hinged & Removable for Ease of Cabling. Use at Least Two Gate Clips per Channel, or One Clip on every 5th or 6th Channel Link.

Figure 34 - Routing of fiber-optic network element cables

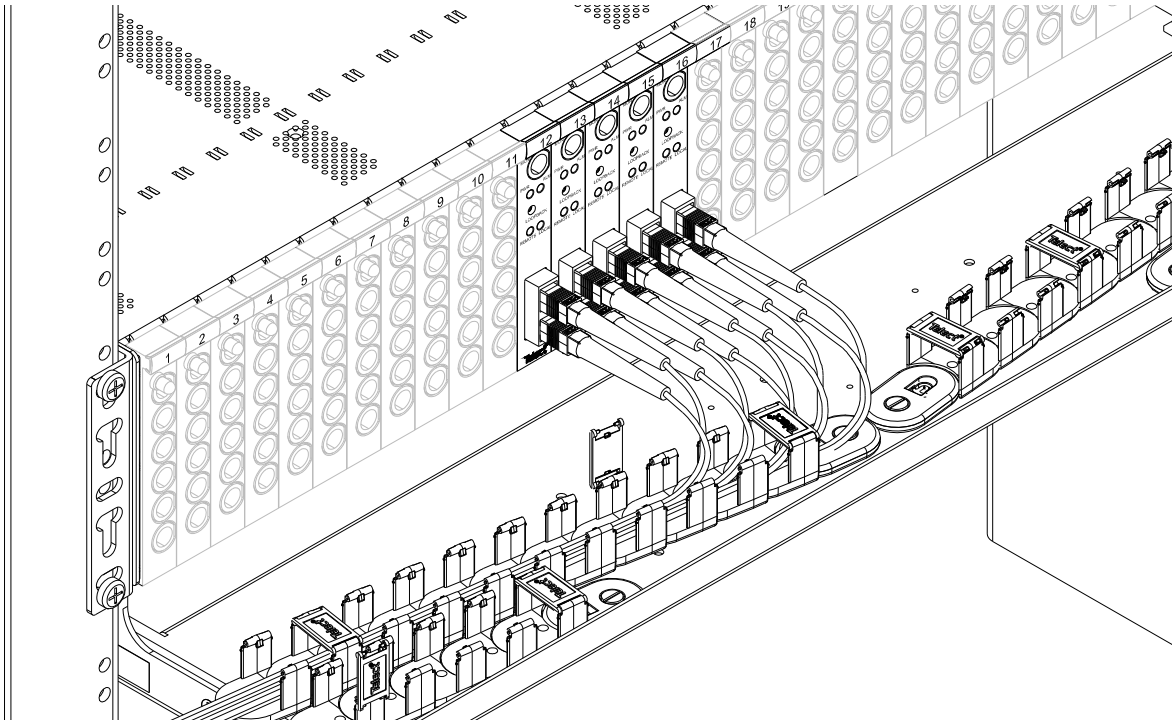


Figure 35 - 23 in. Vector Fiber Tray on a BCSII Chassis Containing *Vertically Mounted* Vector Modules

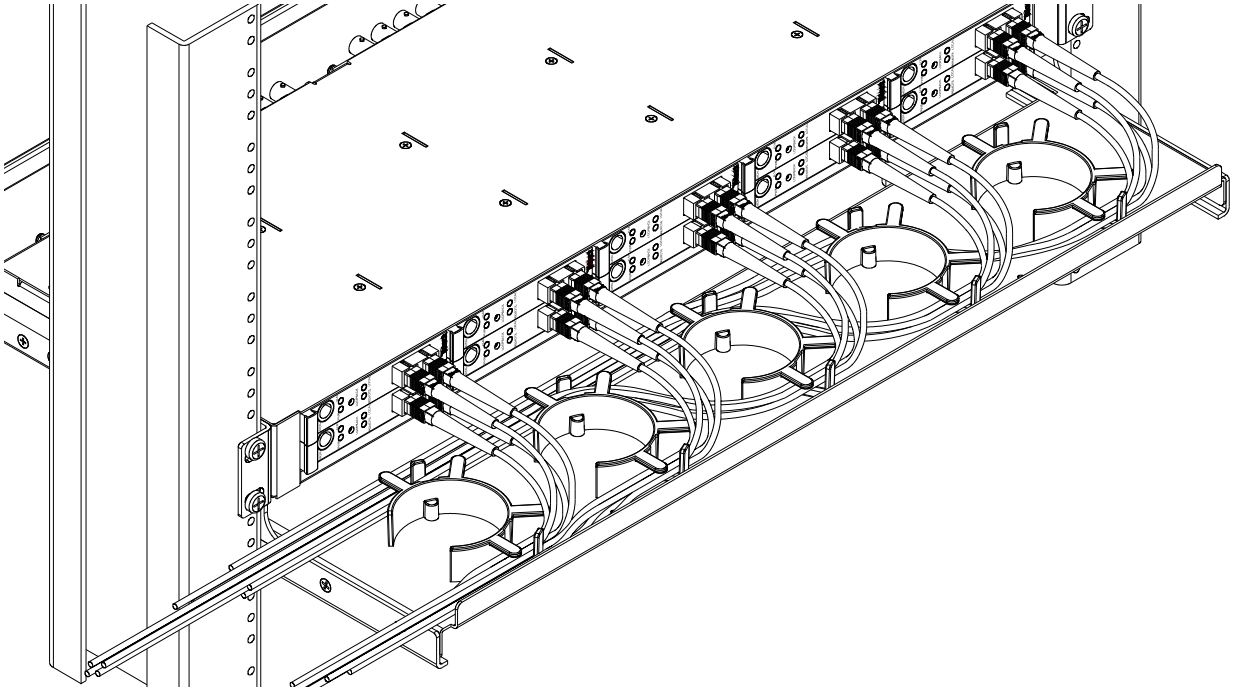
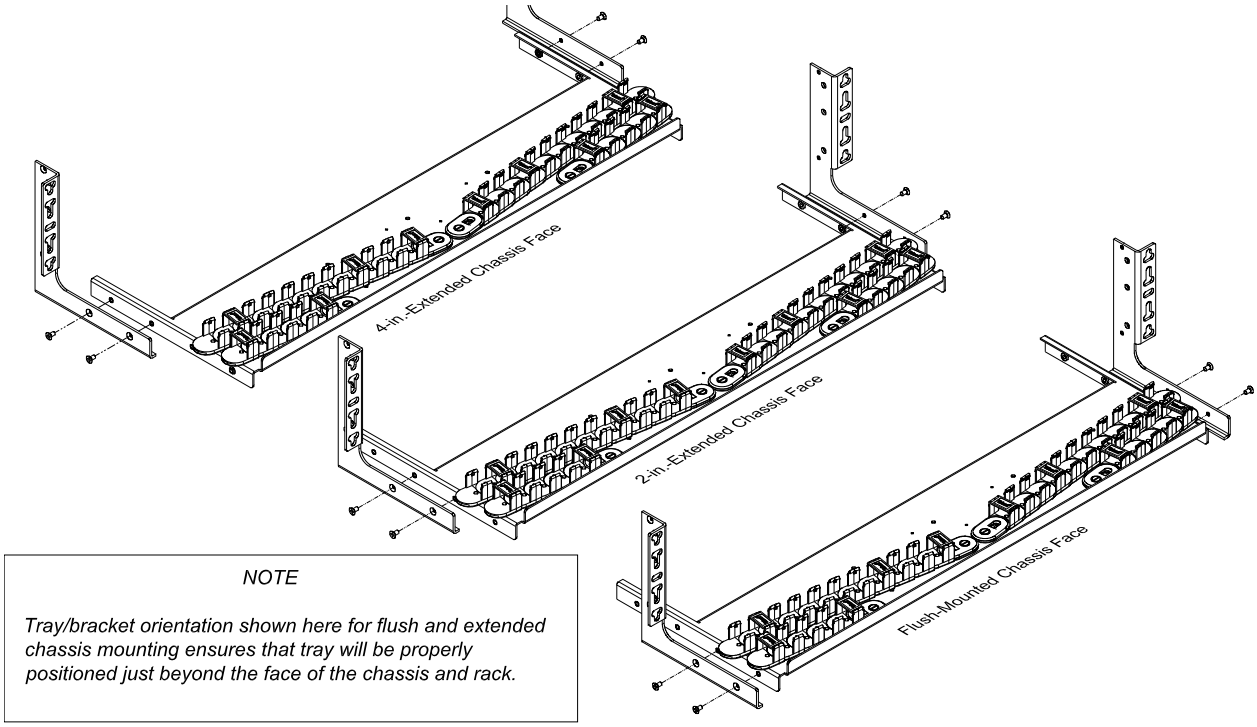


Figure 36 - 23 in. Vector Fiber Tray on a BCSII Chassis Containing *Horizontally Mounted* Vector Modules

To install a BCSII Vector Fiber Tray, proceed as follows:

1. Assemble the bracket to the tray using four, 6-32 Phillips screws (screws with cross-recessed heads) provided, as shown below.



NOTE

Tray/bracket orientation shown here for flush and extended chassis mounting ensures that tray will be properly positioned just beyond the face of the chassis and rack.

Figure 37 - Assembling a bracket

2. Remove the screws holding the standard brackets to the sides of the BCSII chassis, as shown in the following illustrations.

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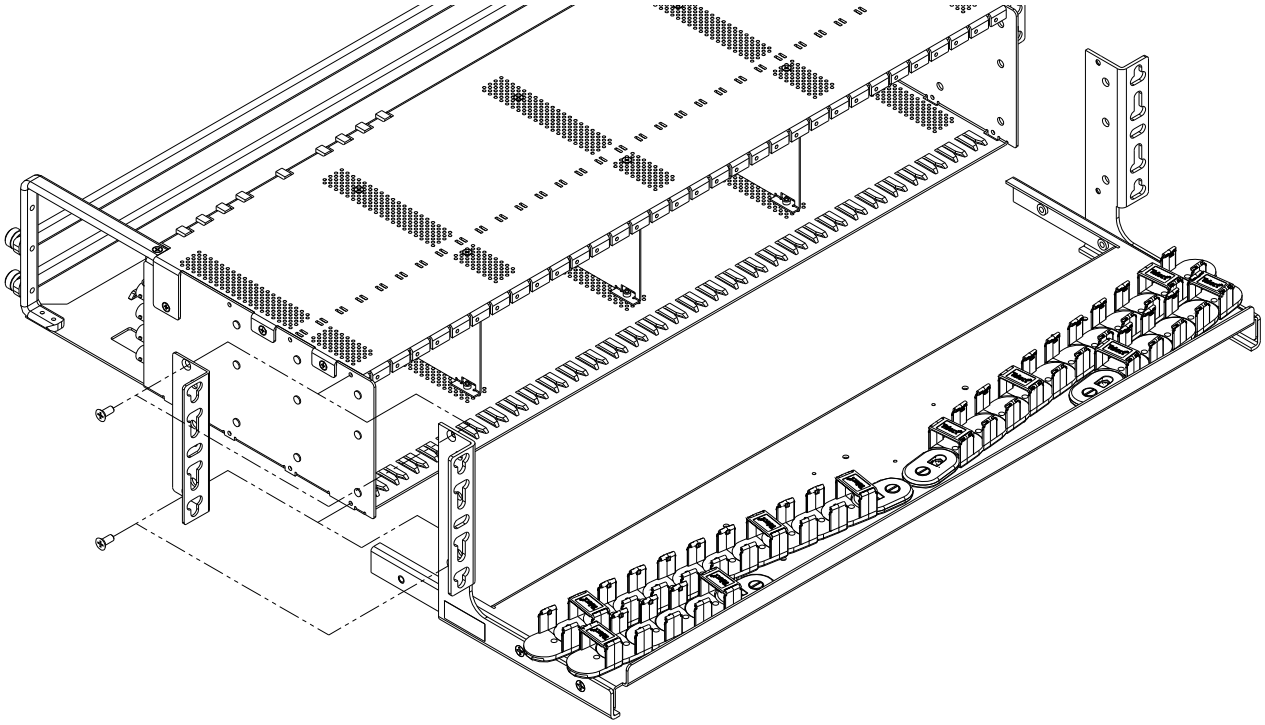

Figure 38 - Removing screws holding standard brackets to sides of BCSII chassis

3. Use these screws to secure the Vector Fiber Tray to the BCSII chassis.
4. Secure the chassis to the rack using the 12-24 screws supplied with the chassis.

NOTE: All Vector Fiber Trays will extend about 4¾ in. beyond the rack flange.

5. Use the illustrations on pages 5-50 through 5-52 as guides for cabling the tray.

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Chapter 6: Vector Wall Mount

6.1 Overview

The Vector Standalone Wall-Mount chassis consists of a wall plate holding a dual-slot chassis. Use three #8 screws (not supplied) to secure unit to wall-mounted rails or plywood, as shown in the following illustration.

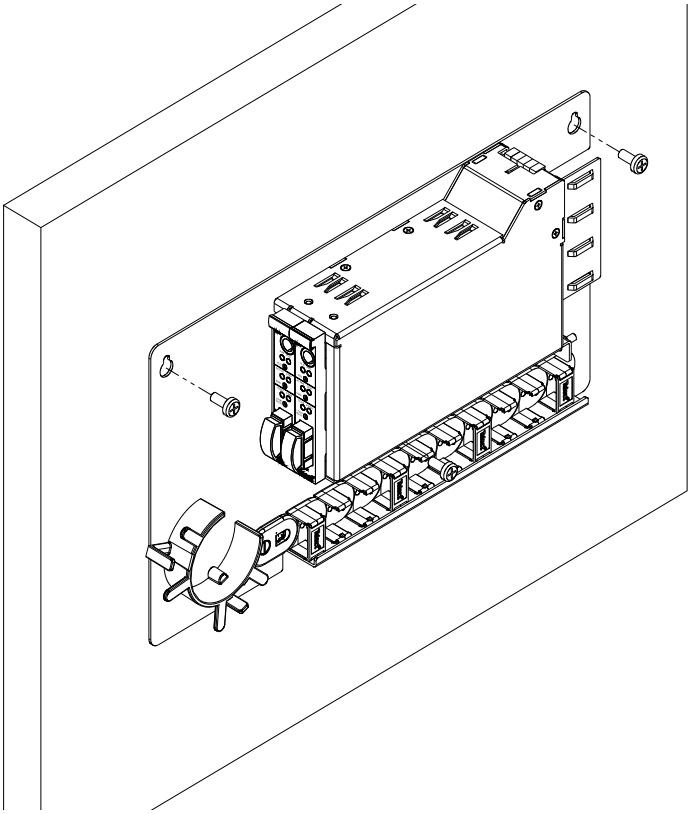

Figure 39 - OPMs (2) in a Standalone Wall-Mount Chassis

Standalone Wall-Mount chassis hold up to two basic (or E-Vector) OTMs or OPMs. The preceding illustration shows a wall-mount chassis with two OPMs; the following illustration shows the chassis with a single OTM.

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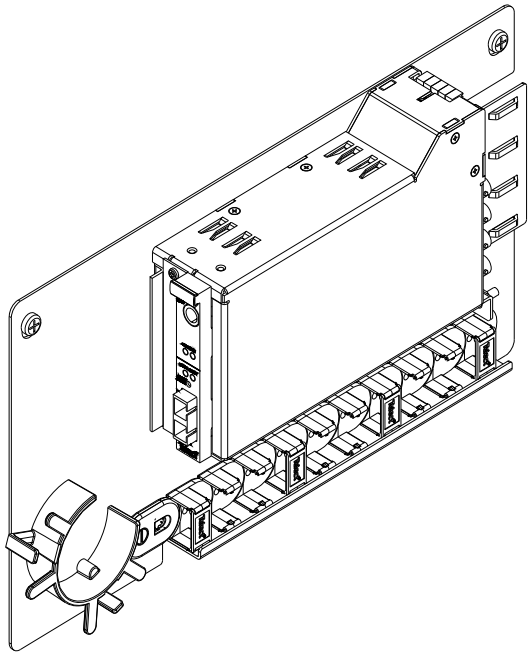

Figure 40 - OTM and a Blank Panel in a Standalone Wall-Mount Chassis

Wall-mount chassis come with one or two OTMs. Wall-mount chassis with modules are listed in the following table. The illustration that follows shows the rear view of each type of chassis.

Wall-Mount Chassis Model No.[a]	Description
Basic OTM (Chassis with One Module & One Front Spacer)[b]	
710-1001-1001-U	Multi-Mode with ST Connectors
710-1001-1002-U	Multi-Mode with SC Connectors
710-1001-2001-U	Single Mode with ST Connectors
710-1001-2002-U	Single Mode with SC Connectors
710-1001-2102-U	Single Mode with SC Connectors, Hardened[c]
Basic OPM (Chassis with Two Modules)	
710-1001-1221-U	Multi-Mode with ST Connectors
710-1001-1222-U	Multi-Mode with SC Connectors
710-1001-2221-U	Single Mode with ST Connectors
710-1001-2222-U	Single Mode with SC Connectors
710-1001-2122-U	Single Mode with SC Connectors, Hardened[b]
E-Vector OTM (Chassis, One Module, One Front Spacer, & Two Rear Spacers)[a]	
710-1001-1301-E	Multi-Mode with ST Connectors
710-1001-1302-E	Multi-Mode with SC Connectors
710-1001-2301-E	Single Mode with ST Connectors

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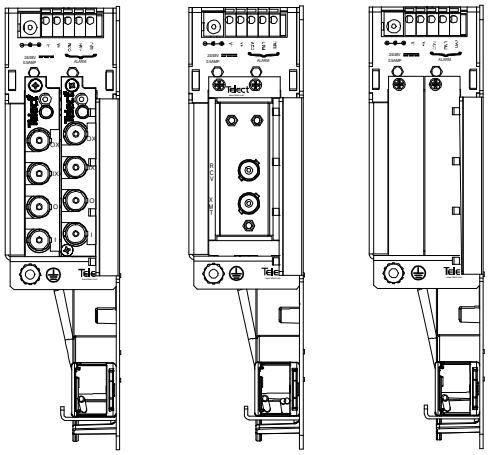
Wall-Mount Chassis Model No.[a]	Description
710-1001-2302-E	Single Mode with SC Connectors

a. Model 710-0000-3201 without modules.
b. Second module is ordered separately.
c. Extended operating temperature range.



Basic OTM Basic OPM E-Vector OTM

Figure 41 - Rear Views of the Wall-Mount Chassis

6.2 Grounding

A #8-32 ground stud with a KEPS nut is located at the rear of the wall-mount chassis. Interconnect the ground stud to the rack or facility dc ground (Do not connect ground wire to ac receptacle ground. Use the dc plant ground.) using a single-hole ground lug with an 18 AWG (min. size) copper wire, as shown in the following illustrations.

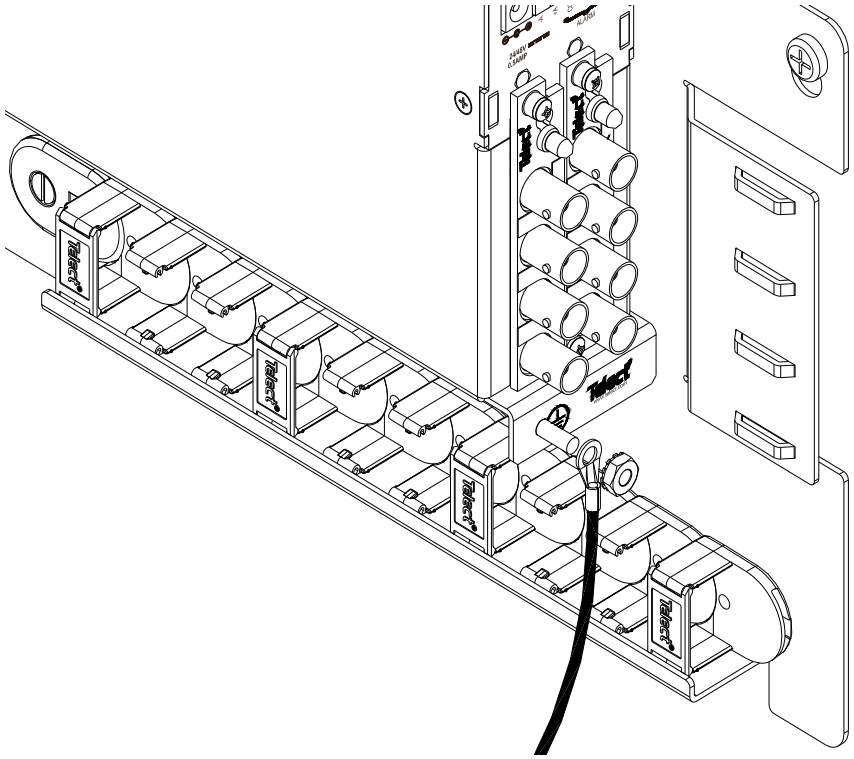


Figure 42 - Grounding

6.3 Power Input

The wall-mount chassis is powered by either plant dc or utility power connected at the top-rear of the chassis. Both plant dc and utility power can be connected to provide redundancy.

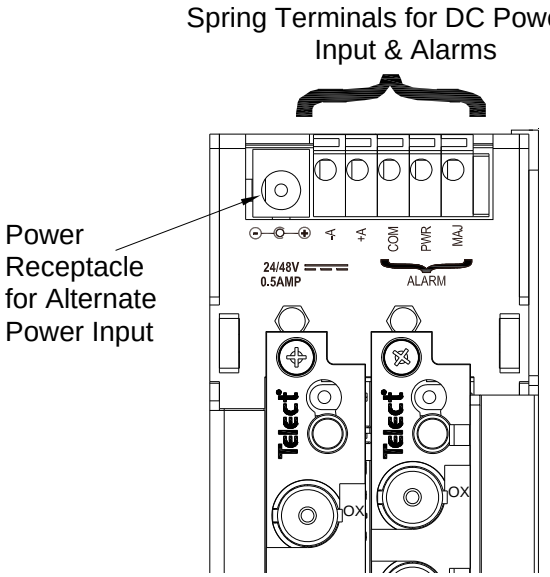


Figure 43 - Vector Wall-Mount Power Connections (Rear View of Chassis)

6.3.1 Plant DC Input

Use the spring connectors along the top-rear of the chassis for plant dc, ±24 or -48Vdc. Spring connectors are also provided for power alarm and major alarm connections. Each position accommodates a 24AWG to 16AWG stranded or solid copper wire. (Stranded wire should be tinned.)

- For a -48Vdc BATT input, connect -48Vdc fused at .5A to **-A** terminal and RTN to **+A**.
- Likewise, for a -24Vdc BATT input, connect -24Vdc fused at .5A to **-A** terminal and +24Vdc to **+A**.

To connect wires to spring terminal connectors, first strip about $^{3}/_{8}$ in. (~10 mm) of insulation and then use a $^{1}/_{8}$-in. (3 mm) flat-tipped screwdriver to open the spring before inserting the wire. Remove the screwdriver to cinch the wire.

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Always route power and alarm cables separately from signal cables. Use cable tie or lacing where required, in accordance with standard operation company practices. Lances are provided at the rear for tying down cables.

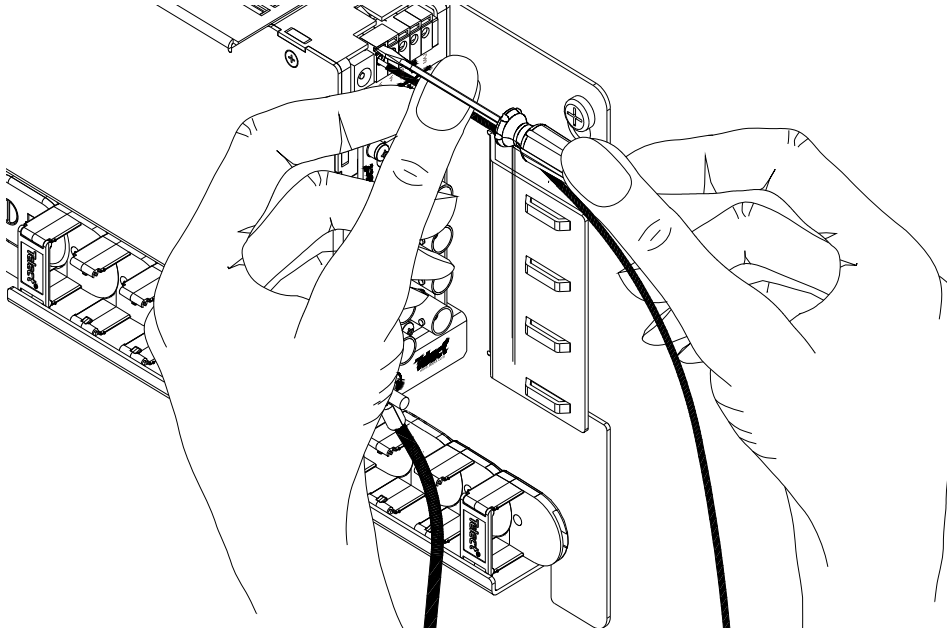

Figure 44 - Connecting Wires

6.3.2 Utility Power Input (Alternate Power)

Use the 2-mm coaxial power connector when feeding from an ac receptacle. The optional Telect power supply (Model 010-0000-9900) accepts inputs of 90-to-264Vac, 50-60Hz from a utility receptacle and converts that to an output of +48Vdc @ 310 mA for the wall-mount chassis. The Telect power supply assembly includes a 7.5 ft ac computer-style power cord for a standard domestic ac receptacle.

If you use an alternate power supply, make sure the center of the coaxial power connector (2 mm center dia) is positive with respect to the sleeve and capable of 20 to 60Vdc (nominally 48Vdc @ 310 mA).

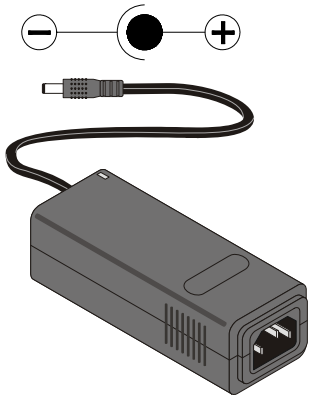

Figure 45 - Power Supply

6.4 Alarm Connections

The power alarm and major alarm connections are made in the same way as the dc plant power connections.

The circuit between **PWR** and **COM** and between **MAJ** and **COM** are normally open, meaning that if a power failure or major failure occurs the respective circuit is closed by the relay on the module.

6.5 Connect Rear-Side BNC Input & Output to NE

Except for E-Vector OTMs, use BNC cables to connect "**I**" and "**O**" at the rear if the wall-mount chassis modules to the input and output of the network element, respectively. (The "**XI**" and "**XO**" connectors are not used.)

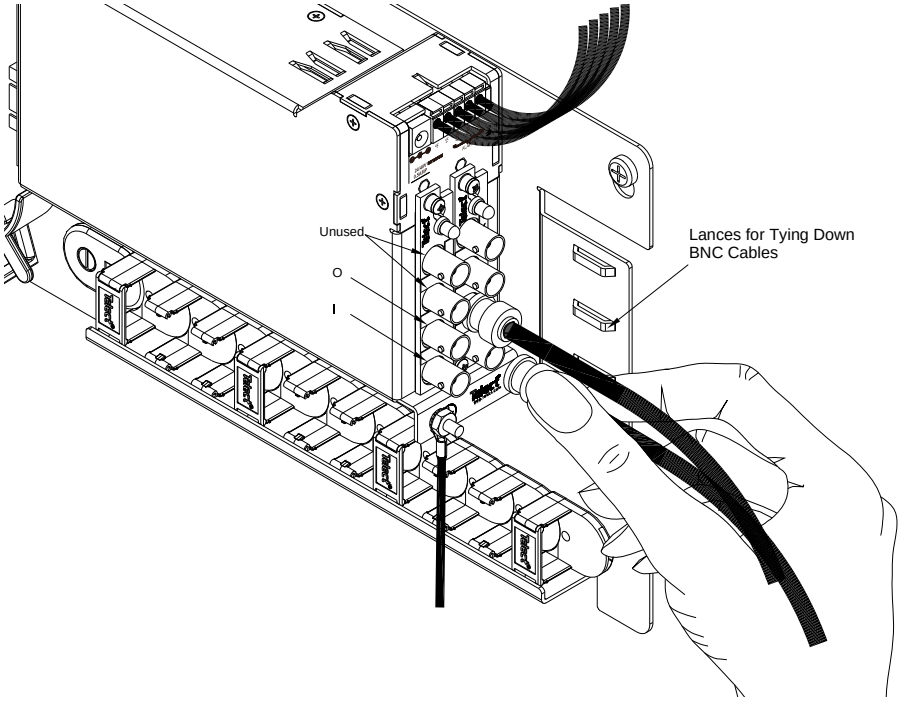

Figure 46 - Connecting Rear-Side BNC Input & Output to NE

BNC connectors are not used in E-Vector applications. NE I/O is handled via the RJ45 connector at the front of E-Vector OTMs.

6.6 Connect & Route Front-Side Fiber

The illustrations that follow shows fiber cable routing for a wall-mount chassis containing two basic OTMs:

1. If you plan to route fiber through the links, swing open the covers shown in the inset in the following illustration.
2. Remove safety plugs from fiber cable and module connectors.
3. Route cable around spool. Choose to either
   - Gather the cable, place it in the linkage, and then close link covers, or
   - Direct the fiber cable to a cable management system (CMS) either above or below the chassis. (The illustration shows fiber cable being fed to an overhead CMS.)

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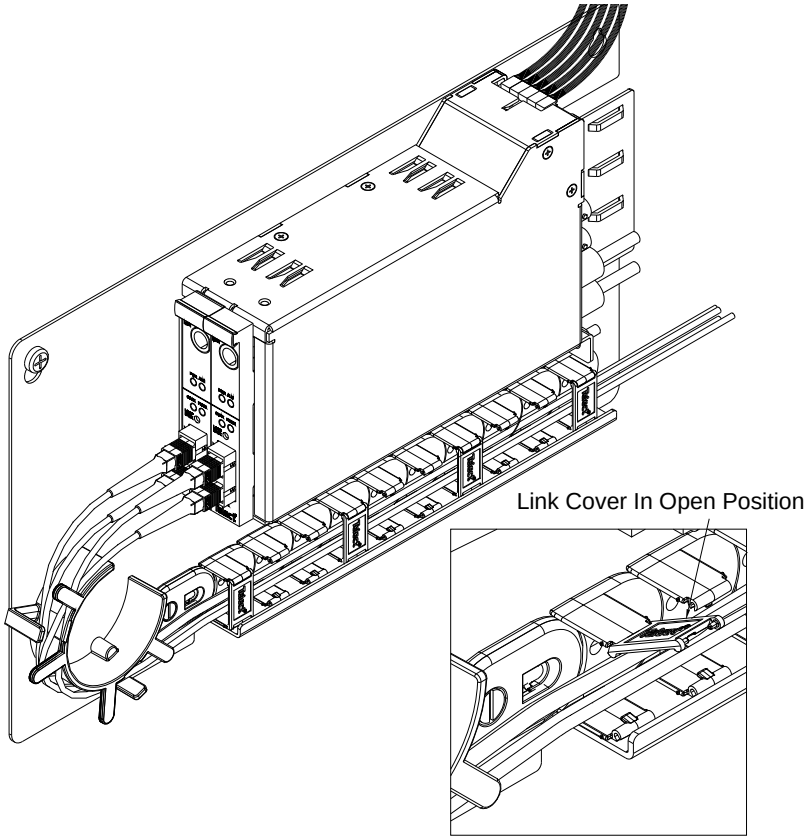

Figure 47 - Fiber Cable Being Fed to an Overhead CMS

Chapter 7: Service

CAUTION

CAUTION! Only qualified technicians may install and maintain this product.

7.1 Owner Maintenance

Telect's Vector products do not need preventive maintenance.

7.2 In Case Of Difficulty

If problems occur after initial installation, check cable connections described in Sections 2 through 6, or in the installation instructions which were shipped with the module.

7.3 Technical Support (USA)

By e-mail: getinfo@telect.com
By phone: 888-821-4856 or 509-921-6161

7.4 In-Warranty Service

Contact your Telect equipment distributor, or call a Telect Customer Service Representative:

1-800-551-4567
1-509-926-6000

Telect will repair or replace defective products within the limits of the warranty. See "Repacking for Shipment" in this section.

Call a Customer Service Representative for a Return Material Authorization (RMA) before returning any equipment.

7.5 Out-Of-Warranty Service

The procedure for out-of-warranty service is the same as for in-warranty service, except that Telect charges a processing fee, and you must submit a Purchase Order along with a Return Material Authorization (RMA) before returning equipment. Call a Customer Service Representative for help getting these forms.

The processing fee guarantees a repair estimate and is credited against actual material and labor costs.

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7.6 Repacking For Shipment

1. Tag the equipment showing owner's name, address, and telephone number, together with a detailed description of the problem.
2. Use the original shipping container if possible. If you do not have it, package the equipment in a way to prevent shipping damage. Include the RMA inside the container and legibly print the RMA number on the outside of the package, near the shipping address.
3. Insure the package.

NOTE: Telect is not liable for shipping damage.

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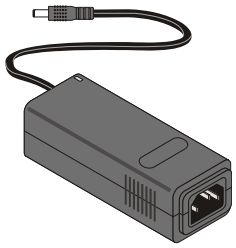
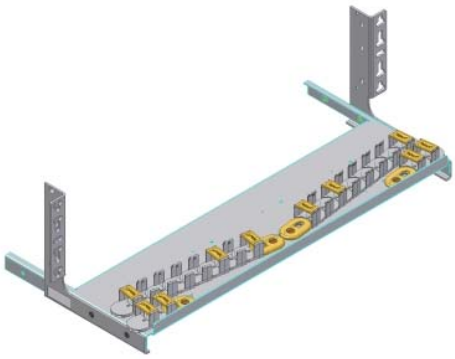
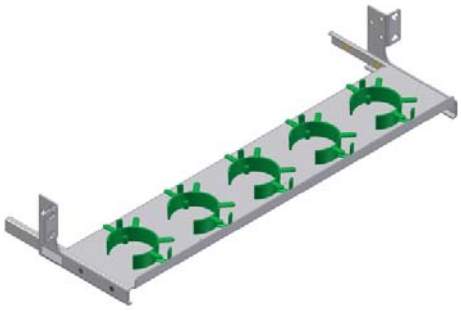
Chapter 8: Vector Accessories

Description	Catalog No.	Illustration
Wall-Mount or Desk-Mount Power Supply for a 90-to-264Vac, 50-60HzUtility Receptacle	010-0000-9900	
Vector BCSII Trays		
19-in. Tray for Horizontal BCSII Chassis	010-0019-0471BCS	
19-in. Tray for Vertical BCSII Chassis	010-0019-2401BCS	
23-in. Tray for Horizontal BCSII Chassis	010-0023-1471BCS	

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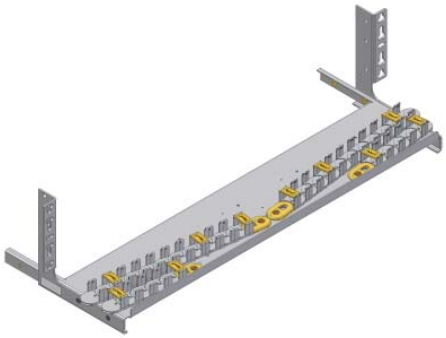
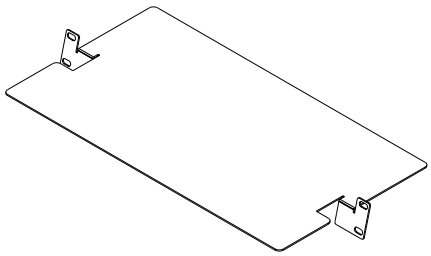
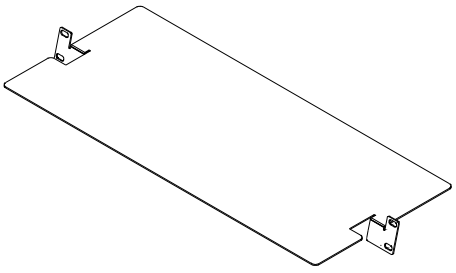
Description	Catalog No.	Illustration
23-in. Tray for Vertical BCSII Chassis	010-0023-3201BCS	
Fiber Jumpers		
• Single mode or 62.5/125 Multimode • 2 mm Simplex • SC or ST Connector on one end; SC or ST Connector on the other • MegaWave or GigaWave • Any length up to 999.0 ft or m	See telect.com to access cable configurator	
BNC Jumpers		
Single RG59 without messenger wire	043-0111-xxx where xxx is length in ft	
Single 735A without messenger wire	043-0911-xxx where xxx is length in ft	
Single 735A with messenger wire	043-1011-xxx where xxx is length in ft	

Description	Catalog No.	Illustration
Dual 735A with messenger wire	043-1311-xxx where xxx is length in ft	
Mini-WECO Monitor Patch Cords		
RG59	043-0122-xxx where xxx is length in ft	
735A	043-0922-xxx where xxx is length in ft	
BCSII Heat Baffles		
19-in. Heat Baffle	747-9999-0019	
23-in. Heat Baffle	747-9999-0023	

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